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GIS Coverages:

Restriction of liability: Neither the state of Idaho nor the Department of Environmental Quality, nor any of their employees make any warranty, express or implied, or assume any legal liability or responsibility for the accuracy, completeness or usefulness of any information or data provided. Metadata is provided for all data sets, and no data should be used without first reading and understanding its limitations. The data could include technical inaccuracies or typographical errors. The Department of Environmental Quality may update, modify, or revise the data used at any time, without notice.

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Report Glossary

305(b)	Refers to section 305 subsection "b" of the Clean Water Act. 305(b) generally describes a report of each state's water quality, and is the principle means by which the U.S. Environmental Protection Agency, Congress, and the public evaluate whether U.S. waters meet water quality standards, the progress made in maintaining and restoring water quality, and the extent of the remaining problems.
§303(d)	Refers to section 303 subsection "d" of the Clean Water Act. 303(d) requires states to develop a list of waterbodies that do not meet water quality standards. This section also requires total maximum daily loads (TMDLs) be prepared for listed waters. Both the list and the TMDLs are subject to U.S. Environmental Protection Agency approval.
Aerobic	Describes life, processes, or conditions that require the presence of oxygen.
Algae	Non-vascular (without water-conducting tissue) aquatic plants that occur as single cells, colonies, or filaments.
Ambient	General conditions in the environment. In the context of water quality, ambient waters are those representative of general conditions, not associated with episodic perturbations, or specific disturbances such as a wastewater outfall (Armantrout 1998, EPA 1996).
Anaerobic	Describes the processes that occur in the absence of molecular oxygen and describes the condition of water that is devoid of molecular oxygen.
Anoxia	The condition of oxygen absence or deficiency.
Anthropogenic	Relating to, or resulting from, the influence of human beings on nature.

Anti-Degradation	Refers to the U.S. Environmental Protection Agency's interpretation of the Clean Water Act goal that states and tribes maintain, as well as restore, water quality. This applies to waters that meet or are of higher water quality than required by state standards. State rules provide that the quality of those high quality waters may be lowered only to allow important social or economic development and only after adequate public participation (IDAPA 58.01.02.051). In all cases, the existing beneficial uses must be maintained. State rules further define lowered water quality to be 1) a measurable change, 2) a change adverse to a use, and 3) a change in a pollutant relevant to the water's uses (IDAPA 58.01.02.003.56).
Aquatic	Occurring, growing, or living in water.
Aquifer	An underground, water-bearing layer or stratum of permeable rock, sand, or gravel capable of yielding of water to wells or springs.
Assimilative Capacity	The ability to process or dissipate pollutants without ill effect to beneficial uses.
Autotrophic	An organism is considered autotrophic if it uses carbon dioxide as its main source of carbon. This most commonly happens through photosynthesis.
Batholith	A large body of intrusive igneous rock that has more than 40 square miles of surface exposure and no known floor. A batholith usually consists of coarse-grained rocks such as granite.
Bedload	Material (generally sand-sized or larger sediment) that is carried along the streambed by rolling or bouncing.
Beneficial Use	Any of the various uses of water, including, but not limited to, aquatic biota, recreation, water supply, wildlife habitat, and aesthetics, which are recognized in water quality standards.
Beneficial Use Reconnaissance Program (BURP)	A program for conducting systematic biological and physical habitat surveys of water bodies in Idaho. BURP protocols address lakes, reservoirs, and wadable streams and rivers.

Benthic	Pertaining to or living on or in the bottom sediments of a water body.
Best Management Practices (BMPs)	Structural, nonstructural, and managerial techniques that are effective and practical means to control nonpoint source pollutants.
Best Professional Judgment	A conclusion and/or interpretation derived by a trained and/or technically competent individual by applying interpretation and synthesizing information.
Biochemical Oxygen Demand (BOD)	The amount of dissolved oxygen used by organisms during the decomposition (respiration) of organic matter, expressed as mass of oxygen per volume of water, over some specified period of time.
Biomass	The weight of biological matter. Standing crop is the amount of biomass (e.g., fish or algae) in a body of water at a given time. Often expressed as grams per square meter.
Biota	The animal and plant life of a given region.
Biotic	A term applied to the living components of an area.
Clean Water Act (CWA)	The Federal Water Pollution Control Act (commonly known as the Clean Water Act), as last re-authorized by the Water Quality Act of 1987, establishes a process for states to use to develop information on, and control the quality of, the nation's water resources.
Coliform Bacteria	A group of bacteria predominantly inhabiting the intestines of humans and animals but also found in soil. Coliform bacteria are commonly used as indicators of the possible presence of pathogenic organisms (also see Fecal Coliform Bacteria).
Community	A group of interacting organisms living together in a given place.
Criteria	In the context of water quality, numeric or descriptive factors taken into account in setting standards for various pollutants. These factors are used to determine limits on allowable concentration levels, and to limit the number of violations per year. EPA develops criteria guidance; states establish criteria.

Cubic Feet per Second	A unit of measure for the rate of flow or discharge of water. One cubic foot per second is the rate of flow of a stream with a cross-section of one square foot flowing at a mean velocity of one foot per second. At a steady rate, once cubic foot per second is equal to 448.8 gallons per minute and 1.984 acre-feet per day.
Decomposition	The breakdown of organic molecules (e.g., sugar) to inorganic molecules (e.g., carbon dioxide and water) through biological and nonbiological processes.
Designated Uses	Those water uses identified in state water quality standards that must be achieved and maintained as required under the Clean Water Act.
Discharge	The amount of water flowing in the stream channel at the time of measurement. Usually expressed as cubic feet per second (cfs).
Dissolved Oxygen (DO)	The oxygen dissolved in water. Adequate DO is vital to fish and other aquatic life.
E. coli	Short for *Escherichia Coli*, *E. coli* are a group of bacteria that are a subspecies of coliform bacteria. Most *E. coli* are essential to the healthy life of all warm-blooded animals, including humans. Their presence is often indicative of fecal contamination.
Empirical	Relying on experiment and observation rather than theory.
Environment	The complete range of external conditions, physical and biological, that affects a particular organism or community.
Ephemeral Stream	A stream or portion of a stream that flows only in direct response to precipitation. It receives little or no water from springs and no long continued supply from melting snow or other sources. Its channel is at all times above the water table. (American Geologic Institute 1962).
Erosion	The wearing away of areas of the earth's surface by water, wind, ice, and other forces.

Eutrophic	From Greek for "well nourished," this describes a highly productive body of water in which nutrients do not limit algal growth. It is typified by high algal densities and low clarity.
Eutrophication	1) Natural process of maturing (aging) in a body of water. 2) The natural and human-influenced process of enrichment with nutrients, especially nitrogen and phosphorus, leading to an increased production of organic matter.
Exceedance	A violation (according to DEQ policy) of the pollutant levels permitted by water quality criteria.
Existing Beneficial Use or Existing Use	A beneficial use actually attained in waters on or after November 28, 1975, whether or not the use is designated for the waters in Idaho's *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 58.01.02).
Flow	See Discharge.
Fluvial	In fisheries, this describes fish whose life history takes place entirely in streams but migrate to smaller streams for spawning.
Fully Supporting	In compliance with water quality standards and within the range of biological reference conditions for all designated and exiting beneficial uses as determined through the *Water Body Assessment Guidance* (Grafe et al. 2002).
Fully Supporting Cold Water	Reliable data indicate functioning, sustainable cold water biological assemblages (e.g., fish, macroinvertebrates, or algae), none of which have been modified significantly beyond the natural range of reference conditions (EPA 1997).
Geographical Information Systems (GIS)	A georeferenced database.
Geometric Mean	A back-transformed mean of the logarithmically transformed numbers often used to describe highly variable, right-skewed data (a few large values), such as bacterial data.

Grab Sample	A single sample collected at a particular time and place. It may represent the composition of the water in that water column.
Gradient	The slope of the land, water, or streambed surface.
Ground Water	Water found beneath the soil surface saturating the layer in which it is located. Most ground water originates as rainfall, is free to move under the influence of gravity, and usually emerges again as stream flow.
Habitat	The living place of an organism or community.
Headwater	The origin or beginning of a stream.
Hydrologic Basin	The area of land drained by a river system, a reach of a river and its tributaries in that reach, a closed basin, or a group of streams forming a drainage area (also see Watershed).
Hydrologic Unit	One of a nested series of numbered and named watersheds arising from a national standardization of watershed delineation. The initial 1974 effort (USGS 1987) described four levels (region, subregion, accounting unit, cataloging unit) of watersheds throughout the United States. The fourth level is uniquely identified by an eight-digit code built of two-digit fields for each level in the classification. Originally termed a cataloging unit, fourth field hydrologic units have been more commonly called subbasins. Fifth and sixth field hydrologic units have since been delineated for much of the country and are known as watershed and subwatersheds, respectively.
Hydrologic Unit Code (HUC)	The number assigned to a hydrologic unit. Often used to refer to fourth field hydrologic units.
Hydrology	The science dealing with the properties, distribution, and circulation of water.
Intergravel Dissolved Oxygen	The concentration of dissolved oxygen within spawning gravel. Consideration for determining spawning gravel includes species, water depth, velocity, and substrate.

Intermittent Stream	1) A stream that flows only part of the year, such as when the ground water table is high or when the stream receives water from springs or from surface sources such as melting snow in mountainous areas. The stream ceases to flow above the streambed when losses from evaporation or seepage exceed the available stream flow. 2) A stream that has a period of zero flow for at least one week during most years.
Irrigation Return Flow	Surface (and subsurface) water that leaves a field following the application of irrigation water and eventually flows into streams.
Limiting Factor	A chemical or physical condition that determines the growth potential of an organism. This can result in a complete inhibition of growth, but typically results in less than maximum growth rates.
Load Allocation (LA)	A portion of a water body's load capacity for a given pollutant that is given to a particular nonpoint source (by class, type, or geographic area).
Load(ing)	The quantity of a substance entering a receiving stream, usually expressed in pounds or kilograms per day or tons per year. Loading is the product of flow (discharge) and concentration.
Loading Capacity (LC)	A determination of how much pollutant a water body can receive over a given period without causing violations of state water quality standards. Upon allocation to various sources, and a margin of safety, it becomes a total maximum daily load.
Macroinvertebrate	An invertebrate animal (without a backbone) large enough to be seen without magnification and retained by a 500µm mesh (U.S. #30) screen.
Macrophytes	Rooted and floating vascular aquatic plants, commonly referred to as water weeds. These plants usually flower and bear seeds. Some forms, such as duckweed and coontail (*Ceratophyllum sp.*), are free-floating forms not rooted in sediment.

Margin of Safety (MOS)	An implicit or explicit portion of a water body's loading capacity set aside to allow the uncertainly about the relationship between the pollutant loads and the quality of the receiving water body. This is a required component of a total maximum daily load (TMDL) and is often incorporated into conservative assumptions used to develop the TMDL (generally within the calculations and/or models). The MOS is not allocated to any sources of pollution.
Mass Wasting	A general term for the down slope movement of soil and rock material under the direct influence of gravity.
Mean	Describes the central tendency of a set of numbers. The arithmetic mean (calculated by adding all items in a list, then dividing by the number of items) is the statistic most familiar to most people.
Metric	A discrete measure of something, such as an ecological indicator (e.g., number of distinct taxon).
Milligrams per liter (mg/L)	A unit of measure for concentration in water, essentially equivalent to parts per million (ppm).
Million gallons per day (MGD)	A unit of measure for the rate of discharge of water, often used to measure flow at wastewater treatment plants. One MGD is equal to 1.547 cubic feet per second.
Monitoring	A periodic or continuous measurement of the properties or conditions of some medium of interest, such as monitoring a water body.
Mouth	The location where flowing water enters into a larger water body.
National Pollution Discharge Elimination System (NPDES)	A national program established by the Clean Water Act for permitting point sources of pollution. Discharge of pollution from point sources is not allowed without a permit.
Natural Condition	A condition indistinguishable from that without human-caused disruptions.
Nitrogen	An element essential to plant growth, and thus is considered a nutrient.

Nonpoint Source	A dispersed source of pollutants, generated from a geographical area when pollutants are dissolved or suspended in runoff and then delivered into waters of the state. Nonpoint sources are without a discernable point or origin. They include, but are not limited to, irrigated and non-irrigated lands used for grazing, crop production, and silviculture; rural roads; construction and mining sites; log storage or rafting; and recreation sites.
Not Assessed (NA)	A concept and an assessment category describing water bodies that have been studied, but are missing critical information needed to complete an assessment.
Not Attainable	A concept and an assessment category describing water bodies that demonstrate characteristics that make it unlikely that a beneficial use can be attained (e.g., a stream that is dry but designated for salmonid spawning).
Not Fully Supporting	Not in compliance with water quality standards or not within the range of biological reference conditions for any beneficial use as determined through the *Water Body Assessment Guidance* (Grafe et al. 2002).
Not Fully Supporting Cold Water	At least one biological assemblage has been significantly modified beyond the natural range of its reference condition (EPA 1997).
Nuisance	Anything which is injurious to the public health or an obstruction to the free use, in the customary manner, of any waters of the state.
Nutrient	Any substance required by living things to grow. An element or its chemical forms essential to life, such as carbon, oxygen, nitrogen, and phosphorus. Commonly refers to those elements in short supply, such as nitrogen and phosphorus, which usually limit growth.
Nutrient Cycling	The flow of nutrients from one component of an ecosystem to another, as when macrophytes die and release nutrients that become available to algae (organic to inorganic phase and return).

Oligotrophic	The Greek term for "poorly nourished." This describes a body of water in which productivity is low and nutrients are limiting to algal growth, as typified by low algal density and high clarity.
Organic Matter	Compounds manufactured by plants and animals that contain principally carbon.
Orthophosphate	A form of soluble inorganic phosphorus most readily used for algal growth.
Oxygen-Demanding Materials	Those materials, mainly organic matter, in a water body that consume oxygen during decomposition.
Parameter	A variable, measurable property whose value is a determinant of the characteristics of a system, such as temperature, dissolved oxygen, and fish populations are parameters of a stream or lake.
Perennial Stream	A stream that flows year-around in most years.
Periphyton	Attached microflora (algae and diatoms) growing on the bottom of a water body or on submerged substrates, including larger plants.
pH	The negative $\log_{10}$ of the concentration of hydrogen ions, a measure which in water ranges from very acid (pH=1) to very alkaline (pH=14). A pH of 7 is neutral. Surface waters usually measure between pH 6 and 9.
Phosphorus	An element essential to plant growth, often in limited supply, and thus considered a nutrient.
Plankton	Microscopic algae (phytoplankton) and animals (zooplankton) that float freely in open water of lakes and oceans.
Point Source	A source of pollutants characterized by having a discrete conveyance, such as a pipe, ditch, or other identifiable "point" of discharge into a receiving water. Common point sources of pollution are industrial and municipal wastewater.

Pollutant	Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.
Pollution	A very broad concept that encompasses human-caused changes in the environment, which alter the functioning of natural processes and produce undesirable environmental and health effects. This includes human-induced alteration of the physical, biological, chemical, and radiological integrity of water and other media.
Population	A group of interbreeding organisms occupying a particular space; the number of humans or other living creatures in a designated area.
Quantitative	Descriptive of size, magnitude, or degree.
Reach	A stream section with fairly homogenous physical characteristics.
Reconnaissance	An exploratory or preliminary survey of an area.
Reference	A physical or chemical quantity whose value is known, and thus is used to calibrate or standardize instruments.
Reference Condition	1) A condition that fully supports applicable beneficial uses with little affect from human activity and represents the highest level of support attainable. 2) A benchmark for populations of aquatic ecosystems used to describe desired conditions in a biological assessment and acceptable or unacceptable departures from them. The reference condition can be determined through examining regional reference sites, historical conditions, quantitative models, and expert judgment (Hughes 1995).
Reference Site	A specific locality on a water body that is minimally impaired and is representative of reference conditions for similar water bodies.
Representative Sample	A portion of material or water that is as similar in content and consistency as possible to that in the larger body of material or water being sampled.

Riffle	A relatively shallow, gravelly area of a streambed with a locally fast current, recognized by surface choppiness. Also an area of higher streambed gradient and roughness.
Riparian	Associated with aquatic (stream, river, lake) habitats. Living or located on the bank of a water body.
River	A large, natural, or human-modified stream that flows in a defined course or channel, or a series of diverging and converging channels.
Runoff	The portion of rainfall, melted snow, or irrigation water that flows across the surface, through shallow underground zones (interflow), and through ground water to creates streams.
Sediments	Deposits of fragmented materials from weathered rocks and organic material that were suspended in, transported by, and eventually deposited by water or air.
Settleable Solids	The volume of material that settles out of one liter of water in one hour.
Species	1) A reproductively isolated aggregate of interbreeding organisms having common attributes and usually designated by a common name. 2) An organism belonging to such a category.
Spring	Ground water seeping out of the earth where the water table intersects the ground surface.
Stream	A natural water course containing flowing water, at least part of the year. Together with dissolved and suspended materials, a perennial stream normally supports communities of plants and animals within the channel and the riparian vegetation zone
Stream Order	Hierarchical ordering of streams based on the degree of branching. A first-order stream is an unforked or unbranched stream. Under Strahler's (1957) system, higher order streams result from the joining of two streams of the same order.
Subbasin	A large watershed of several hundred thousand acres. This is the name commonly given to 4th field hydrologic units (also see Hydrologic Unit).

Subbasin Assessment (SBA)	A watershed-based problem assessment that is the first step in developing a total maximum daily load in Idaho.
Subwatershed	A smaller watershed area delineated within a larger watershed, often for purposes of describing and managing localized conditions. Also proposed for adoption as the formal name for 6th field hydrologic units.
Surface Fines	Sediments of small size deposited on the surface of a streambed or lake bottom. The upper size threshold for fine sediment for fisheries purposes varies from 0.8 to 605 mm depending on the observer and methodology used. Results are typically expressed as a percentage of observation points with fine sediment.
Surface Runoff	Precipitation, snow melt, or irrigation water in excess of what can infiltrate the soil surface and be stored in small surface depressions; a major transporter of nonpoint source pollutants in rivers, streams, and lakes. Surface runoff is also called overland flow.
Surface Water	All water naturally open to the atmosphere (rivers, lakes, reservoirs, streams, impoundments, seas, estuaries, etc.) and all springs, wells, or other collectors that are directly influenced by surface water.
Suspended Sediments	Fine material (usually sand size or smaller) that remains suspended by turbulence in the water column until deposited in areas of weaker current. These sediments cause turbidity and, when deposited, reduce living space within streambed gravels and can cover fish eggs or alevins.
Thalweg	The center of a stream's current, where most of the water flows.

Total Maximum Daily Load (TMDL)	A TMDL is a water body's loading capacity after it has been allocated among pollutant sources. It can be expressed on a time basis other than daily if appropriate. Sediment loads, for example, are often calculated on an annual bases. TMDL = Loading Capacity = Load Allocation + Wasteload Allocation + Margin of Safety. In common usage, a TMDL also refers to the written document that contains the statement of loads and supporting analyses, often incorporating TMDLs for several water bodies and/or pollutants within a given watershed.
Total Dissolved Gas	Dissolved gas is a measure of the pressure of dissolved gas in the water column.
Total Dissolved Solids	Dry weight of all material in solution in a water sample as determined by evaporating and drying filtrate.
Total Suspended Solids (TSS)	The dry weight of material retained on a filter after filtration. Filter pore size and drying temperature can vary. American Public Health Association Standard Methods (Greenborg, Clescevi, and Eaton 1995) call for using a filter of 2.0 micron or smaller; a 0.45 micron filter is also often used. This method calls for drying at a temperature of 103-105 °C.
Tributary	A stream feeding into a larger stream or lake.
Turbidity	A measure of the extent to which light passing through water is scattered by fine suspended materials. The effect of turbidity depends on the size of the particles (the finer the particles, the greater the effect per unit weight) and the color of the particles.
Wasteload Allocation (WLA)	The portion of receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. Wasteload allocations specify how much pollutant each point source may release to a water body.
Water Body	A stream, river, lake, estuary, coastline, or other water feature, or portion thereof.

Water Column	Water between the interface with the air at the surface and the interface with the sediment layer at the bottom. The idea derives from a vertical series of measurements (oxygen, temperature, phosphorus) used to characterize water.
Water Quality	A term used to describe the biological, chemical, and physical characteristics of water with respect to its suitability for a beneficial use.
Water Quality Criteria	Levels of water quality expected to render a body of water suitable for its designated uses. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, or industrial processes.
Water Quality Limited	A label that describes water bodies for which one or more water quality criterion is not met or beneficial uses are not fully supported. Water quality limited segments may or may not be on a §303(d) list.
Water Quality Limited Segment (WQLS)	Any segment placed on a state's §303(d) list for failure to meet applicable water quality standards, and/or is not expected to meet applicable water quality standards in the period prior to the next list. These segments are also referred to as "§303(d) listed."
Water Quality Management Plan	A state or area-wide waste treatment management plan developed and updated in accordance with the provisions of the Clean Water Act.
Water Quality Modeling	The prediction of the response of some characteristics of lake or stream water based on mathematical relations of input variables such as climate, stream flow, and inflow water quality.
Water Quality Standards	State-adopted and EPA-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.
Water Table	The upper surface of ground water; below this point, the soil is saturated with water.

Watershed	1) All the land which contributes runoff to a common point in a drainage network, or to a lake outlet. Watersheds are infinitely nested, and any large watershed is composed of smaller "subwatersheds." 2) The whole geographic region which contributes water to a point of interest in a water body.
Water Body Identification Number (WBID)	A number that uniquely identifies a water body in Idaho ties in to the Idaho Water Quality Standards and GIS information.
Young-of-the-Year	Young fish born the year captured, evidence of spawning activity.

Appendix A. Unit Conversion Chart

Table A-1. Metric - English unit conversions.

	English Units	Metric Units	To Convert	Example
Distance	Miles (mi)	Kilometers (km)	1 mi = 1.61 km 1 km = 0.62 mi	3 mi = 4.83 km 3 km = 1.86 mi
Length	Inches (in) Feet (ft)	Centimeters (cm) Meters (m)	1 in = 2.54 cm 1 cm = 0.39 in 1 ft = 0.30 m 1 m = 3.28 ft	3 in = 7.62 cm 3 cm = 1.18 in 3 ft = 0.91 m 3 m = 9.84 ft
Area	Acres (ac) Square Feet (ft^2) Square Miles (mi^2)	Hectares (ha) Square Meters (m^2) Square Kilometers (km^2)	1 ac = 0.40 ha 1 ha = 2.47 ac 1 ft^2 = 0.09 m^2 1 m^2 = 10.76 ft^2 1 mi^2 = 2.59 km^2 1 km^2 = 0.39 mi^2	3 ac = 1.20 ha 3 ha = 7.41 ac 3 ft^2 = 0.28 m^2 3 m^2 = 32.29 ft^2 3 mi^2 = 7.77 km^2 3 km^2 = 1.16 mi^2
Volume	Gallons (gal) Cubic Feet (ft^3)	Liters (L) Cubic Meters (m^3)	1 gal = 3.78 L 1 L = 0.26 gal 1 ft^3 = 0.03 m^3 1 m^3 = 35.32 ft^3	3 gal = 11.35 L 3 L = 0.79 gal 3 ft^3 = 0.09 m^3 3 m^3 = 105.94 ft^3
Flow Rate	Cubic Feet per Second (cfs)[1]	Cubic Meters per Second (m^3/sec)	1 cfs = 0.03 m^3/sec 1 m^3/sec = 35.31 cfs	3 cfs = 0.09 m^3/sec 3 m^3/sec = 105.94 cfs
Concentration	Parts per Million (ppm)	Milligrams per Liter (mg/L)	1 ppm = 1 mg/L[2]	3 ppm = 3 mg/L
Weight	Pounds (lbs)	Kilograms (kg)	1 lb = 0.45 kg 1 kg = 2.20 lbs	3 lb = 1.36 kg 3 kg = 6.61 lb
Temperature	Fahrenheit (°F)	Celsius (°C)	°C = 0.55 (F - 32) °F = (C x 1.8) + 32	3 °F = -15.95 °C 3 ° C = 37.4 °F

[1] 1 ft^3/sec = 0.65 million gallons per day; 1 million gallons per day is equal to 1.55 ft^3/sec.
[2]The ratio of 1 ppm = 1 mg/L is approximate and is only accurate for water.

Appendix B. State and Site-Specific Standards and Criteria

- As per DEQ WBAG II guidance (Grafe et al. 2002), the Mid Snake/Succor Creek subbasin assessment uses the basin-specific salmonid spawning period for redband trout. The basin- specific spawning period is March 1 through June 15.

- Table B-1 outlines the water quality standards used in the Mid Snake/Succor Creek Subbasin Assessment and TMDL.

Table B-1. Idaho water quality standards uses in the Mid Snake/Succor Creek Subbasin Assessment and TMDL.

Pollutant	Applicable Water Quality Standard
Temperature	No greater than 22 degrees Celsius AND no greater than 19 degrees Celsius maximum daily average During salmonid spawning periods: no greater than 13 degrees Celsius AND no greater than 9 degrees Celsius maximum daily average
Dissolved Oxygen	Greater than 6.0 mg/L except in hypolimnion of stratified lakes and reservoirs
Sediment	Sediment shall not exceed quantities specified in general surface water quality criteria (IDAPA 58.01.02.250 or 252) or, in the absence of specific sediment criteria, quantities which impair designated beneficial uses
Turbidity	Less than 50 NTU[2] above background for any given sample or less than 25 NTU for more than 10 consecutive days (below any applicable mixing zone set by DEQ)
Bacteria	Less than 126 *E. coli* organisms/100 mL as a 30 day geometric mean with a minimum of five samples AND no sample greater than 406 *E. coli* organisms/100 mL
Floating, Suspended, or Submerged Matter (Nuisance Algae)	Surface waters shall be free from floating, suspended, or submerged matter of any kind in concentration causing nuisance or objectionable conditions or that impair designated beneficial uses and be free from oxygen demanding materials in concentrations that would result in an anaerobic water condition
Excess Nutrients	Surface waters shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses
pH	Hydrogen ion concentration (pH) values within the range of 6.5 to 9.0

[1]NTU = nephlometric turbidity unit

Appendix C. Data Sources

Table C-1. Major data sources for the Mid Snake River / Succor Creek Subbasin Assessment.

Water Body	Data Source[1]	Type of Data	When Collected
Snake River	Idaho Power Company, DEQ	Chemical	Ongoing
Succor Creek	IDA, DEQ, BLM, IDFG	Physical, Chemical, Biological	2000-2002
Jump Creek	IDA, DEQ, BLM, IDFG	Physical, Chemical, Biological	1992-93, 2000-2002
Reynolds Creek	ERO, DEQ, ARS	Physical, Chemical, Biological	1965-2001
All other tributaries	DEQ, BLM	Physical, Chemical, Biological	2001-2002

[1]DEQ = Department of Environmental Quality, IDA = Idaho Department of Agriculture, BLM = Bureau of Land Management, IDFG = Idaho Department of Fish and Game, ERO, ARS = Reynolds Creek Agricultural Research Station

Table C-2. Data tiers[1] for data used in the Mid Snake River/Succor Creek TMDL

Stream Segment	Data Source	Data Tier[1]	Proposed TMDL Actions
NF Castle Creek	DEQ	1	TMDL deferral for temperature
SF Castle Creek	BLM, DEQ BURP	1	TMDL deferral-no current bacteria information due to lack of access
Castle Creek	DEQ, BLM	1,2	A sediment TMDL has been prepared for the listed section of Castle Creek; temperature TMDL is deferred
Reynolds Creek (Bernard Ditch to Snake River)	ERO Consulting, Reynolds Creek Agriculture Research Station, DEQ BURP	1	De-list sediment
Jump Creek (Headwaters to Snake River)	Bureau of Reclamation, Owyhee Soil Conservation District, DEQ BURP	1	A sediment TMDL has been prepared for the Mule Creek to Snake River segment of Jump Creek
Sinker Creek (Diamond Creek to Snake River)	DEQ BURP, DEQ Bank Erosion Inventories, DEQ Temperature Loggers, BLM PFC study, Landowner flow data	1,2,3	Sediment and temperature TMDLs have been prepared for Sinker Creek from Diamond Creek down to the Snake River.
Snake River (CJ Strike Dam to Swan Falls Dam)	USGS, IPC, DEQ	1	De-list sediment
Snake River (Swan Falls Dam to Oregon Line)	USGS, IPC, DEQ	1	De-list sediment, pH, bacteria Nutrient allocation DO allocation deferred due to lack of information

Succor Creek (Headwaters to Oregon Line)	DEQ BURP, DEQ Bank Erosion Inventories, DEQ Temperature Loggers	1, 2	Sediment and bacteria TMDLs have been prepared for the headwaters to Oregon line segment. The Tier 2 data are flow data provided by the Succor Creek District Improvement Co.
Succor Creek (Oregon Line to Snake River)	Idaho Department of Agriculture, DEQ Chemical, DEQ BURP	1	A bacteria TMDL has been prepared for the Oregon line to Snake River segment. A sediment TMDL has been prepared from Sage Creek to Snake River.
Cottonwood Creek (Headwaters to Succor Creek)	DEQ Temperature Loggers	1	De-list temperature
Rabbit Creek (Headwaters to Snake River)	DEQ Field Surveys[2]	1	De-list temperature
Corder Creek (Headwaters to Snake River)	DEQ Field Surveys[2]	1	De-list temperature
McBride Creek	DEQ BURP, DEQ Field Surveys[2]	1	De-list temperature
Poison Creek	DEQ BURP, DEQ Field Surveys[2]	1	The Poison Creek in HUC 17050103 is not 303(d) listed. This is a mistake in the 303(d) list.
Hardtrigger Creek	DEQ BURP, DEQ Field Surveys[2]	1	De-list sediment
Pickett Creek	DEQ BURP, DEQ Field Surveys[2]	1	De-list sediment and temperature
Brown Creek	DEQ BURP, DEQ Field Surveys[2]	1	De-list temperature
Birch Creek	DEQ BURP, DEQ Field Surveys[2]	1	De-list sediment
Squaw Creek	DEQ BURP, DEQ, BLM	1	De-list sediment, temperature

[1]Based on IDEQ Water Body Assessment Guidance definitions of Tier 1-Tier 3 data (Grafe et. al. 2002)
[2] Consists of site visits with the intent of collecting flow based data (or) site visits to confirm a zero-flow

Appendix D. Distribution List

USEPA, REGION 10
1200 6TH AVE OW-134
SEATTLE WA 98101

DUANE LA FAYETTE
P.O. BOX 590
BRUNEAU ID 83604

DAVID FERGUSON
2270 PENITENTIARY RD
BOISE ID 83712

TONY BENNETT
2270 PENITENTIARY RD
BOISE ID 83712

PETE SINCLAIR
19 REICH ST, PO 486
MARSING ID 83639

IDAHO STATE LIBRARY
325 W. STATE STREET
BOISE ID 83702

SCOTT KOBERG
132 SW 5TH AVE.
MERIDIAN ID 83642

KEITH GRISWOLD
2208 E. CHICAGO
CALDWELL ID 83605

MELBA CITY HALL
PO 209
MELBA ID 83641

HOMEDALE PUBLIC LIBRARY
25 W. OWYHEE AVE
HOMEDALE ID 83628

MARSING PUBLIC LIBRARY
PO BOX 60
MARSING ID 83639

GANDVIEW PUBLIC LIBRARY
GRANDVIEW ID 83624

JERRY HOAGLAND
HC 79 BOX 44
MELBA ID 83641

WILLIAM PARKER
PO BOX 626
BRUNDEAU ID 83604

RONALD PARKS
233 RODEO AVE
CALDWELL ID 83605

ROBERT THOMAS
HC 79 BOX 2060
OREANA ID 83650

CHARLES KIESTER
RT 1 BOX 235
MARSING ID 83639

ZIGMUND NAPKORA
3948 DEVELOPMENT AVE
BOISE ID 83705

CONNIE BRANDAU
HC 79 BOX 61
MELBA ID 83641

BRIAN COLLETT
HC 79 BOX 2197
OREANA ID 83650

JAMES KENT FRISCH
HC 85 BOX 366
GRAND VIEW ID 83624

BRIAN HOELSCHER
PO BOX 70
BOISE ID 83707

REX BARRIE
PO BOX 67
HOMEDALE ID 83628

Appendix E. An Assessment of Intermittence for §303(d) Listed Streams in the Mid Snake River/Succor Creek watershed (HUC 17050103)

Introduction and Scope

The Mid Snake River/Succor Creek watershed (HUC 17050103) is a 2,002 square mile watershed consisting of the Snake River from CJ Strike Dam to the Idaho/Oregon line (river mile 409) and several perennial and intermittent streams. Table 1 and Figure 1 show the §303(d) listed intermittent streams in 17050103, which are the streams of concern addressed in this analysis. The state of Idaho defines an intermittent stream as one that has a period of zero flow for at least one week during most years or has a 7Q2 hydrologically-based flow of less than 0.10 cfs (IDAPA 58.01.02.003.51). If a stream contains naturally perennial pools containing significant aquatic life, it is not considered intermittent.

Table 1. §303(d) listed intermittent streams in HUC 17050103

Stream Name	§303(d) Listed Boundaries	Aspect
McBride Creek	Headwaters to Oregon Line	South of the Snake River
Corder Creek	Headwaters to Snake River	North of the Snake River
Rabbit Creek	Headwaters to Snake River	North of the Snake River
Brown Creek	Headwaters to Catherine Creek	South of the Snake River
Hardtrigger Creek	Headwaters to Snake River	South of the Snake River
Birch Creek	Headwaters to Snake River	South of the Snake River
Poison Creek	Headwaters to Shoofly Creek	South of the Snake River
Pickett Creek	Headwaters to Catherine Creek	South of the Snake River

The hydrology of each stream in Table 1 is different depending on its location in the watershed. The upper segment (before it enters the Snake River valley) of each stream typically flows for a few months during the late winter and early spring and goes dry shortly thereafter. The lower segments (in the Snake River valley) are quite varied. In some cases, the lower segments rarely contain water, even when the upper segments contain water. In these instances the water seeps into the ground before it can inundate the lower channel. In other cases, the lower segments contain water even after upper segments have gone dry. The presence of water in these instances is likely due to a combination of irrigation practices and ground water influence. In other instances, water has not been documented in the stream at all, although it is apparent that it existed historically.

The intent of this evaluation is to use the available data to show that the streams in Table 1 are intermittent. Ideally, a calculation of the 7Q2 in combination with field notes and photographs would be used to determine the intermittence of a stream. Unfortunately, insufficient flow data exists to calculate the 7Q2.

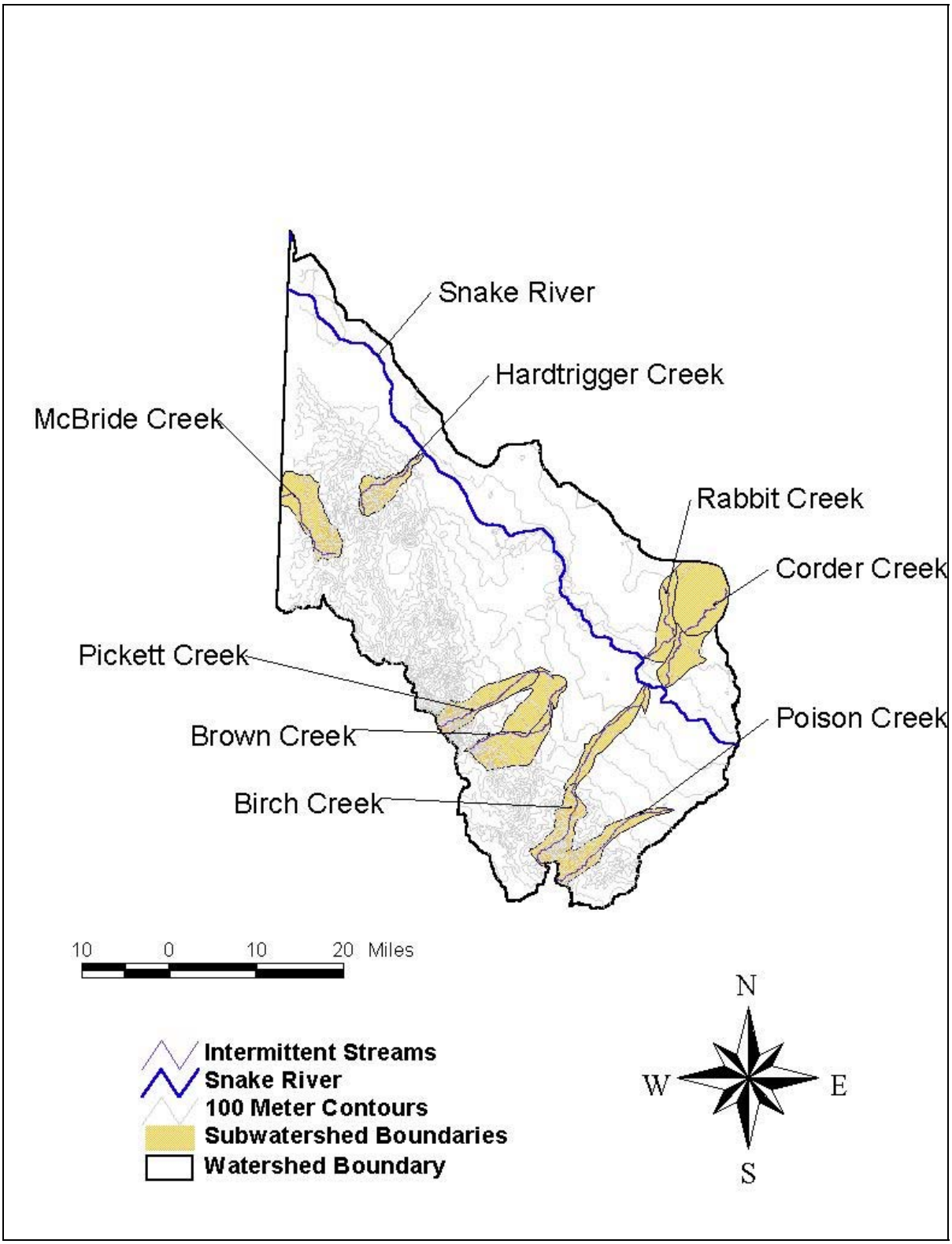


Figure 1. 303(d) listed intermittent streams in HUC 17050103

While some states have developed region specific regression equations to calculate the 7Q2 for ungaged streams, none were identified for Idaho. Regression equations to estimate the annual average stream flows were located, but the standard error of the estimates for the Snake River Basin were too large to provide reasonable flow estimates. Given the lack of flow data to calculate the 7Q2, two lines of evidence are used for the evaluation: 1) instantaneous flow measurements collected as part of BURP and 2) time-dated site photographs. These lines of evidence provide sufficient data to determine whether periods of zero-flow exist.

The water quality standards (IDAPA 58.01.02.070.07) state that water quality standards shall only apply to intermittent waters during optimum flow periods sufficient enough to support the beneficial uses for which the water body has been designated. The optimum flow for contact recreation is equal to or greater than 5.0 cfs. The optimum flow for aquatic life is equal to or greater than 1.0 cfs.

The implication of this rule is that a TMDL for a stream is not appropriate unless it is shown that a *pollutant* impairs aquatic life when flows exceed 1.0 cfs. The hydrology of most intermittent streams, including those listed in Table 1, is such that the time of year when flows exceed 1.0 cfs corresponds with spring runoff. Determining beneficial use support status during the runoff period often yields false determinations of pollutant-caused impairment. These false determinations occur because the biotic community in the stream is limited by high velocity flushing flows as runoff occurs and then by a shortage of time to establish a fully functioning community before the stream goes dry. Thus, the aquatic life community is limited by hydrological conditions, not pollutants.

If instances occur where the flow exceeds 1.0 cfs during base flow (non-spring runoff) and the biota is impaired by a pollutant, further evaluation will be performed and a TMDL will be considered. If this instance does not occur it will be assumed that a TMDL is not appropriate and the stream will be proposed for de-listing. If the stream is a large pollutant contributor to downstream waters (such as the Snake River), the development of a pollutant management plan will be considered.

Flow Data Summary

Photographs of the following streams can be found in Appendix 1 at the conclusion of this analysis. Table 2 summarizes the flow data for each stream. It should be noted that many of the streams flow to the Snake River. The confluence of those streams often contain water year around due to backwater and Snake River bank storage. This hydrological aspect of the stream is not considered when determining the intermittence of the system.

McBride Creek

McBride Creek extends for a length of 12 miles from its headwaters to where it enter Jump Creek. Flow data from June 1996 show flows of 0.20 cfs in the lower segment and 0 cfs in the upper segment. Flow data from July 2001 shows a flow of 0 cfs in the lower segment. There are no major tributaries to McBride Creek and its flow regime is dictated by the water year. In a normal year, McBride Creek typically goes dry by late May or early June.

Corder Creek
Corder Creek extends for a length of 17.2 miles from its headwaters to where it enters the Snake River. Flow data from May 1995, June 1998 and March 2002 all show a flow of 0 cfs. Along with Rabbit Creek, Corder Creek is one of the two §303(d) listed streams that flows in a southerly direction into the Snake River. Water has not been documented in Corder Creek and the stream channel is difficult to find because it has been filled with tumbleweeds. Corder Creek may flow during extreme, episodic flood events, but there is no evidence of recent water.

Rabbit Creek
Rabbit Creek extends for a length of 11.9 miles from its headwaters to where it enters the Snake River. Flow data from May 1995, June 1998, and March 2002 all show a flow of 0 cfs. Along with Corder Creek, Rabbit Creek is one of the two §303(d) listed streams that flows in a southerly direction into the Snake River. Water has not been documented in Rabbit Creek and the stream channel is difficult to find due to the overgrowth of sagebrush. Rabbit Creek may flow during extreme, episodic flood events, but there is no evidence of recent water.

Brown Creek
Brown Creek extends for a length of 17.1 miles from its headwaters to where it enters Catherine Creek. Buckaroo Creek, which is located near the Brown Creek headwaters, is the only major tributary. Buckaroo Creek is only 5.7 miles in length and only contributes water during the spring snowmelt. Flow data for Brown Creek from June 1996 shows a flow of 0.50 cfs in the upper segment. The lower segment was dry, although a small amount of water was located in the stream near its confluence with Catherine Creek. Data from July 2001 shows a flow of 0 cfs in the upper segment. Data from March 2002 also shows that water was present in the upper segment (no measurement taken), but that no water was present in the lower segment. In a normal year, the upper segment of Brown Creek goes dry by mid to late June. The lower segment may contain water during storm events, but goes dry shortly thereafter.

Hardtrigger Creek
Hardtrigger Creek extends for a length of 12.7 miles from its headwaters to where it enters the Snake River. There are no major tributaries to Hardtrigger Creek. Flow data from July 1995 and August 1996 indicate no flow in the upper and lower segments, respectively. Data from June 1998 show a flow of 3.9 cfs in the lower segment and 5.1 cfs in the upper segment. While visiting the stream in March 2002, DEQ staff noted that the flow was less than 1.0 cfs and was beginning to go dry. In a normal year Hardtrigger Creek typically goes dry by mid to late June.

Birch Creek
Birch Creek extends for a length of 24.5 miles from its headwaters to where it enters the Snake River. McKeeth Wash, which enters Birch Creek near the mouth, is the only major tributary to the stream. McKeeth Wash is 13 miles in length and contributes water only during the spring snowmelt. Flow data for Birch Creek from May 1995 show a flow of 3.8 cfs in the lower segment. Data from July 2001 at the upper segment show a flow of 0 cfs.

When DEQ visited the lower segment of the stream in March 2002 the stream was dry. The upper segment of Birch Creek contains water for a short period of time in the spring but is dry shortly thereafter. The lower segment contains water for a longer period of time but is typically dry by June.

Poison Creek

Poison Creek extends for a length of 17.5 miles from its headwaters to where it enters Shoofly Creek. There are no major tributaries to Poison Creek. Flow data from July 1995 shows a flow of 0.3 cfs in the lower segment. Data from July 2001 from locations in the upper and lower segments show flows of 0 cfs. The upper segment of Poison Creek carries water during the spring snowmelt, but goes dry shortly thereafter. The lower segment is dry except during peak runoff periods or extreme storm events.

Pickett Creek

Pickett Creek extends for a length of 16.37 miles from its headwaters to where it enters Catherine Creek, a tributary to Castle Creek. There are no major tributaries to Pickett Creek. The lowermost mile of Pickett Creek has flows, generally below 1 cfs except during high water, year round due to the flow contribution of springs. The flows in the upper reach of Pickett Creek dropped below 1 cfs in July and the creek was dry by fall. The middle section of Pickett Creek went dry in mid-July approximately 3 miles upstream of where Pickett Creek flows into Catherine Creek. Landowners state that, in general, Pickett Creek is dry in the middle section by mid to late June, depending upon the water year.

Table 2. Flow data for selected intermittent streams in HUC 17050103 (flows in cfs)

Stream Name								
Date	McBride	Corder	Rabbit	Brown	Hardtrigger	Birch	Poison	Pickett
5/95		0	0	US-.50 LS-0		LS-3.8		US-24.94
7/95					US-0 LS-0		LS-.30	
6/96	US-0 LS-.20							US-14.91 MS-7.8 LS-6.1
8/96					US-0 LS-0			
6/98		0	0		US-5.1 LS-3.9			
6/01						US-0		
7/01	LS-0			US-0			US-0 LS-0	
3/02		0	0		US-<1	LS-0		
5/02								US-13.58
7/02								US-0.28 LS-0.86
10/02								0

US = Upper Segment
LS = Lower Segment
Blank Cells indicate no data available

Conclusion

The data in the aforementioned narratives and in Table 2 show that in a normal water year each of the streams have extended periods of zero flow following spring runoff. As such, the streams are considered intermittent and the pollutant standards outlined in the *Idaho Water Quality Standards and Wastewater Treatment Requirements* apply only during base flow periods when flows exceed 1.0 cfs. The data in Table 2 also show that in a normal year the base flow condition in each stream is a dry channel. Periods of zero flow extending well beyond one week in length are the normal condition for these streams. Additionally, in the years when water has remained present into the expected base flow months (July-September) the flows were well below 1.0 cfs. For these reasons, TMDLs will not be prepared for McBride, Corder, Rabbit, Brown, Hardtrigger, Birch, Pickett, and Poison Creeks.

Appendix 1. Photographs of §303(d) listed intermittent streams in HUC 17050103.

Birch Creek

Lower Segment, March 2002

Upper Segment, July 2001

Brown Creek

Lower Segment, March 2002

Upper Segment, March 2002

Lower Segment, June 1996

Corder Creek

June 1998

March 2002

Rabbit Creek

April 2002

April 2002

McBride Creek

Lower Segment, June 1996

Upper Segment, June 1996

Lower Segment, July 2001

Hardtrigger Creek

Lower Segment, August 1996

Upper Segment, August 1996

Upper Segment, June 1998

Poison Creek

Lower Segment, July 2001

Upper Segment, July 2001

Pickett Creek

October 2002

Appendix F. Segments of the §303(d) Listed Streams in HUC 17050103 Appropriate for Salmonid Spawning – Correspondence between DEQ and IDFG

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1445 North Orchard • Boise, Idaho 83706-2239 • (208) 373-0550

Dirk Kempthorne, Governor
C. Stephen Allred, Director

May 28, 2002

Mr. Jeff Dillon
Regional Fishery Manager
Idaho Department of Fish and Game
3101 S. Powerline Road
Nampa ID 83686

RE: Status of Salmonid Populations in Castle, Sinker, Reynolds and Succor Creeks

Dear Mr. Dillon:

The Idaho Department of Environmental Quality (IDEQ) is currently preparing the Subbasin Assessment (SBA) as part of the Total Maximum Daily Load (TMDL) process for hydrologic unit 17050103 (see enclosed maps). The purpose of the SBA is to evaluate the current water quality conditions and determine whether a TMDL is necessary. Castle, Sinker, Reynolds and Succor Creeks are included in the SBA.

A critical part of the SBA is to determine whether the designated beneficial uses are appropriate. The segments of Castle, Sinker, Reynolds and Succor Creeks identified on the enclosed maps and in Table 1 are designated in the *Idaho Water Quality Standards and Wastewater Treatment Requirements* for salmonid spawning. However, a review of the hydrologic regime, temperature regime and stream gradient leads IDEQ to believe that these segments are not salmonid spawning segments and are erroneously designated as such.

Table 1. Stream segments of concern

Stream Name	Segment
Castle Creek	Township 5S, Range 1E, Section 28 to Snake River
Sinker Creek	Diamond Creek to Snake River
Reynolds Creek	Bernard Ditch to Snake River
Succor Creek	Idaho-Oregon Line to Snake River

Recognizing that the Idaho Department of Fish and Game is the agency responsible for managing the fisheries of Idaho, IDEQ would like to garner IDFG's opinion into this matter. Please review the enclosed maps and provide a written response to the following questions:

1. Are salmonids known to spawn in the segments of Sinker, Castle, Reynolds and Succor Creeks identified on the maps? If so, when was spawning activity last documented?

Mr. Jeff Dillon
Regional Fishery Manager
Idaho Department of Fish and Game
3101 S. Powerline Road
Nampa ID 83686

2. If salmonid spawning is not occurring in the segments of Sinker, Castle, Reynolds and Succor Creeks identified on the maps, do the segments have the ecological potential to support spawning? If so, what aspects of the segments need to improve before spawning will occur? If not, why is spawning unlikely to occur?

3. What are IDFG's management goals for fish populations and fisheries in the segments of Sinker, Castle, Reynolds and Succor Creeks identified on the maps?

IDEQ appreciates IDFG's participation in helping to accurately characterize the status of salmonid spawning in the aforementioned streams. These characterizations are imperative in identifying appropriate TMDL goals. If we can answer any questions, please feel free to contact Bryan Horsburgh at 373-0550.

Sincerely,

Craig Shepard
Regional Manager
Water Quality

Enclosures

Cc: Steve West, IDEQ
Leslie Freeman, IDEQ
Bryan Horsburgh, IDEQ

IDAHO FISH & GAME
SOUTHWEST REGION
3101 South Powerline Road
Nampa, Idaho 83686

Dirk Kempthorne/Governor
Steven Huffaker/Director

Craig Shepard
Idaho Department of Environmental Quality
1445 N. Orchard
Boise, ID 83706-2239

June 27, 2002

RE: Request for information on Castle, Sinker, Reynolds, and Succors creeks

Craig,

We have reviewed our files and reports for data on the above streams within the reaches outlined in the maps you provided. Unfortunately IDFG has virtually no fish data for these reaches, likely because most or all are located on private property and are heavily impacted by habitat alterations and irrigation withdrawals and return flows. We do have thermograph data for some reaches, all of which indicates temperatures above 25C during summer months.

Redband trout are present in all of these streams in reaches above those of interest. Typically the upper reaches are located on public land, have higher gradient, and better habitat.

Although we have no definitive data, I agree that the reaches outlined are unlikely to support salmonid spawning under current conditions. Historically, the lower reaches were likely used as seasonal migration corridors connecting upstream populations to the Snake River. Currently there may be barriers to upstream migrants at some irrigation diversions. Given the low gradient and temperature regime, I suspect that the potential to support trout spawning is low, even if substantial habitat improvement occurred. Maintaining or enhancing suitability as migration corridors remains important.

All of these streams are managed for wild redband trout fisheries, with the knowledge that currently most or all of the resident populations occur in upper reaches on public land. Succor Creek Reservoir is supplemented with sterile hatchery rainbow trout.

If you have questions or would like access to the thermograph data, please feel free to contact me.

Regards,

Jeff Dillon
Regional Fishery Manager

Appendix G. Major Assessment Methods Used in the Mid Snake River/Succor Creek Subbasin Assessment – WBAG II, SSTEMP, Stream Bank Erosion Inventory

DEQ Water Body Assessment Guidance Document (WBAG) II

WBAG II (Grafe et al. 2000) is available in its entirety on DEQ's web page. The address is: http://www.deq.state.id.us/water/surface_water/wbag/WBAG2001.htm

The 10 major components of WBAG II are described in this technical appendix

This Water Body Assessment Guidance (WBAG) is intended as an analytical tool to guide individuals through a standardized assessment process. The WBAG describes Idaho Department of Environmental Quality (DEQ) methods used to evaluate data and determine beneficial use support of Idaho water bodies. This document is a revision of the 1996 WBAG (DEQ 1996).

A water body assessment entails analyzing and integrating multiple types of water body data to address three primary objectives.

1. Determine the beneficial use support of a water body.

2. Determine the degree of biological integrity.

3. Compile descriptive information about the water body.

The regulatory context of the assessment process and how these rules, regulations, and policies are related to DEQ reporting requirements are discussed in Section 1. The Clean Water Act and Idaho water quality standards drive the assessment process and DEQ reporting requirements for the 303(d) list, 305(b) report, subbasin assessments, and legislative reports.

Section 2 discusses how DEQ collects, analyzes, and manages DEQ data used in the assessment process. This section describes the Beneficial Use Reconnaissance Program (BURP) and trend monitoring network. This also includes the methods used to stratify (classify data by stream order and land use) and compare the data for use support determination. Additionally, Section 2 explains the Idaho Water Body Identification System (the scale used to define Idaho water bodies) and the DEQ method used to distinguish between streams and rivers (water body classes for bioassessment).

In Section 3, the WBAG provides guidance on how to identify beneficial uses for assessment purposes. For designated waters, the assessor simply looks to the Idaho water quality standards. However, for undesignated waters, DEQ identifies beneficial uses for assessment based on existing data. Actual subsequent use designations may be different, depending upon additional information that may be received following the procedures described in Idaho Code and water quality standards.

In Section 4, the DEQ policy concerning when and how data from sources other than BURP may be used in water body assessments is discussed. All data are evaluated based on scientific rigor and relevance criteria. Tier I data, that is BURP compatible, is incorporated

directly into the appropriate aquatic life assessment index.

Non-BURP compatible Tier I data may also be used for 303(d) listing or delisting purposes, if it meets DEQ data policy requirements set forth in this section.

DEQ uses Tier II data for 305(b) reporting and subbasin assessments, and Tier III data for planning purposes.

The interpretation of numeric or narrative criteria exceedances is explained in Section 5. Narrative criteria are largely evaluated based on the DEQ bioassessment process. A violation of numeric criteria for dissolved oxygen, pH, turbidity, temperature, and total dissolved gas occurs when more than 10 percent of the measurements are above the numeric criteria. DEQ considers climatic conditions, natural background, and species-specific spawning time periods when evaluating whether 10 percent or more of the temperature measurements are above the numeric criteria.

Section 6 explains how DEQ uses multimetric indexes to determine aquatic life use support. DEQ uses different indexes depending on whether the water body is classified as a stream or river. The Stream Macroinvertebrate Index, Stream Habitat Index, and Stream Fish Index comprise the stream indexes; the river indexes consist of the River Macroinvertebrate Index, River Diatom Index, and River Fish Index. Supporting technical analyses for these documents are found in the *Idaho Stream Ecological Assessment Framework* (Grafe 2002b) and *Idaho River Ecological Assessment Framework* (Grafe 2002c) documents distributed separately from the WBAG.

DEQ uses the integrated results from the appropriate multi-metric indexes to evaluate subcategories (cold water aquatic life and salmonid spawning) of the aquatic life beneficial use. DEQ applies appropriate numeric criteria separately for cold water aquatic life and salmonid spawning before formulating a final aquatic life use support determination.

How DEQ uses bacteria and toxic data to assess contact recreation beneficial use support is described in Section 7. DEQ uses the geometric mean of bacteria data to determine if water quality standards for primary or secondary contact have been violated. When no data are available, DEQ may evaluate the potential risk for a violation in determining use support.

In Section 8, how DEQ uses toxics data to evaluate domestic, agricultural, and industrial water supplies is discussed. In general, DEQ presumes these uses are fully supporting unless there is evidence to the contrary. This policy is similarly applied for wildlife habitat and aesthetics, as explained in Section 9.

Section 10 attempts to further explain the assessment process through the use of an example. The policies and methods described in Sections 2 through 7 are illustrated in this example. In Section 11, how the public may appeal use support determinations is discussed. The public may petition against assessment determinations during appropriate 303(d) listing or subbasin assessment public comment periods. DEQ will review the appeal and respond accordingly.

SSTEMP Modeling Approach

The SSTEMP v. 1.2.2 model is used to calculate the heat gained or lost from a parcel of water as it passes through a segment. The model assesses the affect parameters such as solar radiation, channel morphology, instream flow, air temperature, and stream shading have on water temperature.

The SSTEMP model requires input data for 28 parameter and state variables ranging from channel conditions to climate. Many of these parameters were kept constant for all model runs. Other parameters were varied based on site-specific conditions. The following is a description of the model-input parameters as they relate to the streams in the Mid Snake River/Succor Creek watershed.

Input Variables

Stream Hydrology:

Segment Inflow: For all scenarios with headwater streams, this value was set at zero. For stream segments below the headwaters, the flow was measured using the standard set interval method using a Marsh-McBirney flow meter.

Inflow Temperature: For all scenarios with headwater streams, this value was set at 6.0 ^{o}C. For stream segments below the headwaters, the temperature was measured using HOBO temperature loggers.

Segment Outflow: This value was measured using the standard set interval method using a Marsh-McBirney flow meter.

Accretion Temperature: This is the expected ground water temperature. This value is the average yearly air temperature from the nearest climatic gauging station. Data were taken from the Western Regional Climate Center at http://www.wrcc.dri.edu/climsum.html.

Stream Geometry:

Segment Lengths: These were derived from the stream reach length from GIS coverages.

Latitude: These were derived from a USGS 7.5-minute quad maps.

Dams at Heads of Segments: No dams were figured into the model.

Upstream Elevation: This was determined for each stream reach from USGS 7.5-minute quad maps.

Downstream Elevation: This was determined for each stream reach from USGS 7.5-minute quad maps.

Width's A Term: This is the wetted width of the stream when the model is calibrated. The width was calculated when flow was determined. This is the value used as the width's A Term in the model. The width value was adjusted to 12 in some model runs to represent a width/depth ratio consistent with an unimpaired Rosgen Type C channel. The use of the wetted width is an accepted input parameter if the stream width is not varied during the model run (Bartholow 1999).

Width's B Term: If wetted width is used in the model, then the Width's B Term is zero.

Manning's n: This is a roughness coefficient used to describe the amount stream bottom. A default value of 0.035 was used because of the variability of substrate in the Mid Snake River/Succor Creek watershed. The substrate varies from sand-silt to large boulders. The gradient can vary from 1-6%.

Meteorology:

Air Temperature: This value is the daily mean air temperature for each month as determined by the nearest climatic gauging station. Data were taken from the Western Regional Climate Center at http://www.wrcc.dri.edu/climsum.html. In some streams, HOBO temperature loggers were place on the stream bank. Thus, local site specific data are available.

Maximum Air Temperature: The maximum air temperature is predicted by SSTEMP unless the user overrides the value. This override was used on Succor Creek below the reservoir because exceedances of the maximum daily temperature values occurred.

Relative Humidity: This value is the mean of four monthly values as determined by the nearest climatic gauging station. Data were taken from the Western Regional Climate Center at http://www.wrcc.dri.edu/climsum.html. The value was then corrected for elevation using the following formula:

$$Rh = R_o*[1.6040\text{^}(T_o-T_a)] * [T_a+273.16)/(T_o+273.16)]$$

where: Rh = relative humidity for temperature T_a
R_o = relative humidity at station T_a
T_a = air temperature at segment
To = air temperature at station
^ = exponentiation

$$0 <= Rh <= 1$$

Wind Speed: The value obtained was from the National Weather Service in Boise, Idaho.

Ground Temperature: This is the expected ground temperature. This value is the average yearly air temperature from the nearest climatic gauging station. Data were taken from the Western Regional Climate Center at http://www.wrcc.dri.edu/climsum.html.

Thermal Gradient: A default setting of 1.65 joules/m^2/sec was used.

Possible Sun: This value was obtained from the National Weather Service in Boise, Idaho.

Dust Coefficient: The input value was set at 6 units for entire run of the model. The input value range is 3 to 10 as supplied by Bartholow (1999) and taken from Tennessee Valley Authority (1972). The middle value was used as the input value due to a lack of data.

Ground Reflectivity: The input value was set at 15 and represents flat ground and rock (range 12-15). The high value was selected due to bare soils with high amounts of silt and sand in the surrounding soils.

Solar Radiation: This was defined by the model based on input parameters.

Stream Shade:

Shade: This was generated by the model based on input values for calibration. Shade contains both topographic and vegetation shade. Vegetative shade then adjusted to obtain water quality criteria or the best achievable temperature (if the criteria cannot be met). Topographic shade was determined by value input from topographic attitude. The model then determined vegetation shade as shade increased. That is, since the topographic shade is a steady state input, increases in total shade represent an increase in vegetation shade.

Optional Shading Parameters:

Shading parameters are optional inputs. For the Mid Snake River/Succor Creek watershed these values were entered during calibration using available data or estimates of vegetative potential. In most incidences, once the required reductions (joules/m^2/sec) were calculated the model ignored these parameters.

Segment Azimuth: This was determined from USGS 7.5-minute topographic maps. Streams that have a general south to north flow (headwaters to mouth) have an azimuth of zero (0.00 radians).

Topographic Attitude: This is a measure of the average incline to the horizon on both the left and right banks. This value was determined one of two ways: 1) by calculating the elevation change over the distance and converting it to a degrees (rise over run) with a USGS 7.5 minute topographic map or 2) measuring it in the field with an inclinometer.

Vegetation Height: Most of the riparian woody vegetation associated with riparian areas in the Mid Snake River/Succor Creek Watershed is willows (S*alix sp.*). Some of the willow species that can be encountered include whiplash willow (*S. lasiandra*), sandbar willow (*S. longifollia*), and coyote willow (*S. exigua*). Most of these species are low lying shrubs with a canopy height between 7 and 15 feet. To account for different species, an input value of 12 to 13 feet was set as default for vegetation height.

Vegetation Crown: Many of the aspects discussed in vegetation height hold true for the vegetation crown. Most of the woody vegetation in the riparian areas are low brushy species

with multiple shoots creating a dense canopy. To account for different species encountered, an input value of 10 feet was set as the default for vegetation canopy on both the west and east sides.

Vegetation Offset: Vegetation offset is the distance from the edge of the water body to the main trunk of the riparian vegetation. Values ranging from 2 to 10, depending on the stream, were used in the model.

Vegetation Density: Bartholow (1999) suggested a dense emergent vegetation cover could have a vegetation density 90%. This value was used as "quality" portion of the vegetation density measurement. The second portion of the vegetation density measurement is the "quantity" measurement. For example, in Succor Creek it is estimated that 25% of the banks contain shade producing vegetation. Based on these values, the vegetation density used in the model is .90*.25 = 23%.

* Density values for Sinker Creek derived from Idaho Conservation Data Center, IDFG (2001) literature values

Time of Year:

Time of Year: The value was set at the 1st or 15th of each month being modeled. This computes an average value for a 30-day model run. This value is most important for determining length of day and angle of the sun.

Output Variables

Intermediate Values:

Day Length: This value was determined by the input for time of year and latitude.

Slope: This value was calculated from input values for elevation change and stream length

Width: This is the same as the width input value.

Depth: This value was calculated from segment outflow, gradient and depth.

Vegetation Shade: this is total shade minus topographic shade. Vegetation shade may vary based on time of year and azimuth inputs.

Topographic Shade: The model calculates this from input for latitude, time of year, azimuth, and topographic attitude.

Mean Heat Flux (Inflow or Outflow):

Convection: Convection component heat flux gain or loss at inflow or at outflow.

Atmosphere: Atmosphere component heat flux gain.

Conduction: Conduction component heat flux gain or loss at inflow or outflow.

Friction: Friction component heat flux gain or loss.

Evaporation: Friction component heat flux gain or loss at inflow or outflow.

Solar: Solar component heat flux gain or loss.

Background Radiation: Background radiation component heat flux gain or loss at inflow or outflow.

Vegetation: Vegetation component heat flux gain or loss.

Net: Net increase or decrease of heat flux from the sum of the above mentioned components.

Model Results-Outflow Temperature:

Predicted Mean Temperature: Model predicted mean daily water temperature in relation to model inputs.

Estimated Maximum Temperature: Model estimated maximum water daily temperature.

Approximate Minimum Temperature: Model approximated minimum daily water temperature (mean temperature - (maximum temperature-mean temperature)).

Mean Equilibrium: Model mean daily water temperature equilibrium if conditions remain the same.

Maximum Equilibrium: Model maximum daily water temperature equilibrium which the maximum temperature may approach.

Minimum Equilibrium: Model minimum daily water temperature which the minimum temperature may approach (equilibrium mean temperature - (equilibrium maximum temperature - equilibrium mean temperature)).

Model Validation

The model was validated by determining the root mean square error for the average daily temperatures for each month. The root mean square error presents an estimate of the variation in the same units as the measurement (e.g. ^{o}C). The following tables describe the results for validation of the SSTEMP model and those water temperatures measured in each water body. Overall the model has provided a reasonable estimate of predicting current conditions and establishing reasonable guidance for predicting water temperature changes by increasing the amount of shade.

Validation Results for May – Succor Creek

	Actual Measured Daily Average C^o	Predicted Daily Average C^o
HW to Berg	10.56	10.42
Berg to Chipmunk	Insufficient	Data
Res. to Oregon	12.7	10.3
Average	11.3	10.4
Root Mean Square Error	1.43 C^o	--
Relative Error	13.8%	--

Validation Results for June – Succor Creek

	Actual Measured Daily Average C^o	Predicted Daily Average C^o
HW to Berg	12.6	11.9
Berg to Chipmunk	13.1	12.2
Res. to Oregon	13.1	11.6
Average	12.9	11.9
Root Mean Square Error	0.59 C^o	--
Relative Error	4.9%	--

Validation Results for July – Succor Creek

	Actual Measured Daily Average C^o	Predicted Daily Average C^o
Res. to Oregon	16.3	14.9
Average	16.3	14.9
Root Mean Square Error	NA	NA
Relative Error	NA	NA

Validation Results for August – Succor Creek

	Actual Measured Daily Average C^o	Predicted Daily Average C^o
Res. to Oregon	17.9	16.7
Average	17.9	16.7
Root Mean Square Error	NA	NA
Relative Error	NA	NA

Validation Results for July 2000 – Sinker Creek

Diamond Creek to Snake River	Actual Measured Daily Average C^o	Predicted Daily Average C^o
July 17, 2002	20.27	20.83
July 18, 2002	19.12	18.73
July 19, 2002	19.35	19.02
July 20, 2002	19.5	19.27
July 21, 2002	19.43	19.66
July 22, 2002	18.97	19
July 23, 2002	19.5	20.36
Average	19.45	19.55
Root Mean Square Error	1.16 C^o	--
Relative Error	5.9%	--

Stream Bank Erosion Inventory

Introduction
The intent of this summary is to document the instream sediment measures and data assessment methods used to develop the gross sediment budget used in the Mid Snake River/Succor Creek TMDL. These data are intended to characterize the existing condition of the stream banks, estimate the desired level of erosion and sedimentation (define reference conditions), and provide baseline data that can be used in the future to track the effectiveness of TMDL implementation. For example, the stream bank erosion inventories can be repeated after implementation and ultimately provide an adaptive management or feedback mechanism.

Stream Bank Erosion Inventory
The stream bank erosion inventory is used to estimate background and existing stream bank erosion following methods outlined in the proceedings from the NRCS Channel Evaluation Workshop (1983). Using the direct volume method, subsections of Succor Creek, Sinker Creek and, Castle Creek were surveyed to determine the extent of chronic bank erosion and estimate the needed reductions.

The NRCS stream bank erosion inventory is a field based methodology that measures stream bank/channel stability, length of active eroding banks, and bank geometry. The stream bank/channel stability inventories were used to estimate the long-term lateral recession rate. The recession rate is determined from field evaluation of stream bank characteristics that are assigned a categorical rating ranging from 0 to 3. The categories of rating factors and rating scores are:

Bank Stability:
- Do not appear to be eroding - 0
- Erosion evident - 1
- Erosion and cracking present - 2
- Slumps and clumps sloughing off - 3

Bank Condition:
- Some bare bank, few rills, no vegetative overhang - 0
- Predominantly bare, some rills, moderate vegetative overhang - 1
- Bare, rills, severe vegetative overhang, exposed roots - 2
- Bare, rills and gullies, severe vegetative overhang, falling trees - 3

Vegetation/Cover On Banks:
- Predominantly perennials or rock-covered - 0
- Annuals / perennials mixed or about 40% bare - 1
- Annuals or about 70% bare - 2
- Predominantly bare - 3

Bank/Channel Shape:
- V - Shaped channel, sloped banks - 0
- Steep V - Shaped channel, near vertical banks - 1
- Vertical Banks, U - Shaped channel - 2
- U - Shaped channel, undercut banks, meandering channel - 3

Channel Bottom:

Channel in bedrock / noneroding - 0
Soil bottom, gravels or cobbles, minor erosion - 1
Silt bottom, evidence of active downcutting - 2

Deposition:

No evidence of recent deposition - 1
Evidence of recent deposits, silt bars - 0

Each measured stream segment, which is representative of a larger reach of stream, is rated based on the criteria above. Each category is rated and summed. For example, a stream segment may receive a weighted score of 7 based on bank stability = 1, bank condition = 1, vegetation/cover on banks = 1.5, bank/channel shape = 2.0, channel bottom = 0.5, deposition = 1. From a score of 7, the stream segment then receives a weighted cumulative rating based on the criteria below. A score of 7 receives a cumulative rating of moderate.

Cumulative Rating:

Slight (0-4) Moderate (5-8) Severe (9+)

From the cumulative rating, the weighted lateral recession rate is assigned. This lateral recession a rate defines the amount of bank being lost per year due to bank erosion.

0.01 - 0.05 feet per year	**Slight**
0.06 - 0.15 feet per year	**Moderate**
0.16 - 0.3 feet per year	**Severe**
0.5+ feet per year	**Very Severe**

Stream banks were inventoried to quantify the bank erosion rate and annual average erosion. These data were used to develop a quantitative sediment budget to be used for TMDL development.

Site Selection

The first step in the bank erosion inventory is to identify key problem areas. Stream bank erosion tends to increase as a function of watershed area (NRCS 1983). As a result, the lower stream segment of larger watersheds tend to be problem areas. These stream segments tend to be alluvial streams commonly classified as response reaches (Rosgen B and C channel types).

Because it is often unrealistic to survey every stream segment, sampled reaches were used and bank erosion rates were extrapolated over a larger stream segment. The length of the sampled reach is a function of stream type variability where streams segments with highly variable channel types need a large sample, whereas segments with uniform gradient and consistent geometry need smaller sample.

Stream reaches are subdivided into sites with similar channel and bank characteristics. Breaks between sites are made where channel type and/or dominate bank characteristics

change substantially. This is commonly defined by a corresponding change in land use. In a stream with uniform channel geometry there may be only one site per stream reach, whereas in an area with variable conditions there may be several sites.

Field Method
Stream bank erosion or channel stability inventory field methods were originally developed by the U.S. USFS (Pfankuch 1975). Further development of channel stability inventory methods are outlined in Lohrey (1989) and NRCS (1983). As stated above, the NRCS (1983) document outlines field methods used in this inventory. However, slight modifications to the field methods were made and are documented.

Field crews surveyed selected stream reaches measuring bank length, slope height and bank full width and depth. Additionally, while surveying field crews photograph key problem areas.

Bank Erosion Calculations
The direct volume method is used to calculate the average annual erosion rates for a given stream segment based on the bank recession rate determined in the survey (NRCS 1983). The erosion rate (tons/mile/year) is used to estimate the total bank erosion of the selected stream corridor. The direct volume method is summarized in the following equation:

$$E = [A_E * R_{LR} * \rho_B]/2000 \quad \text{(lbs/ton conversion)}$$

where:
E = bank erosion over sampled stream reach (tons/yr/sample reach)
A_E = eroding area (ft^2)
R_{LR} = lateral recession rate (ft/yr)
ρ_B = bulk density of bank material (lps/ft^3)

Total bank erosion is expressed as an annual average. However, the frequency and magnitude of bank erosion events are greatly a function of soil moisture and stream discharge (Leopold et al 1964). Because channel erosion events typically result from above average flow events, the annual average bank erosion value should be considered a long term average. For example, a 50-year flood event might cause 5 feet of bank erosion in one year, and over a ten-year period this event accounts for the majority of bank erosion. These factors have less of an influence where bank trampling is the major cause of channel instability.

The *eroding area* (A_E) is the product of linear horizontal bank distance and average bank slope height. Bank length and slope heights are measured while walking along the stream channel. A laser range finder is used to measure horizontal distance, and bank slope heights are continually measured and averaged over a given reach or site. The horizontal length is the length of the right or left bank, not both. Typically, one bank along the stream channel is actively eroding. For example, the bank on the outside of a meander. However, both banks of channels with severe headcuts or gullies will be eroding and are to be measured separately and eventually summed.

Determining the *lateral recession rate* (R_{LR}) is one of the most critical factors in this methodology (NRCS 1983). Several techniques are available to quantify bank erosion rates: aerial photo interpretation, anectodal data, bank pins, and channel cross-sections among others.

To facilitate consistent data collection, the NRCS developed rating factors to estimate lateral recession rate. Similar to methods developed by Pfankuch (1975), the NRCS method measures bank and channel stability, and then uses the ratings as surrogates for bank erosion rates. For the Mid Snake River/Succor Creek TMDL, the NRCS measurement method is used (as described above). The lateral recession rates for each stream can be found in the worksheets in Appendix H.

The *bulk density* (ρ_B) of bank material is estimated ocularly in the field, then verified based on the data provided by NRCS. Soil bulk density is the weight of material divided by its volume, including the volume of its pore spaces. A table of typical soil bulk densities can be used, or soil samples can be collected and soil bulk density measured in the laboratory.

Appendix H. Stream Bank Erosion Inventory Results

The analyses that follow provide the data used to populate Table 46 in the TMDL chapter of this document. Appendix G contains the specific information regarding the equation variables.

Succor Creek Segments

1. Headwaters to Granite Creek
2. Granite Creek to Little Cottonwood Creek
3. Little Cottonwood Creek to Succor Creek Reservoir
4. Succor Creek Reservoir to Oregon Line

Castle Creek Segments

1. Township 5S, Range 1W Section 28 to Snake River

The overall current erosion rate for Castle Creek was calculated by taking a weighted average of the erosion rates (tons/mile/year) calculated for the four sections listed in this appendix. These four sections comprised more than 90% of the listed reach.

The target bank erosion rate was determined by using the erosion rate for the reference section. This method takes into account slope lengths as well as the lateral recession rate for an area of 85% bank stability. This target erosion rate provides a benchmark for the amount of sediment expected to be lost from an 85% stable bank of similar stream classification. The overall bank erosion rate for the entire stream was compared to the target bank erosion rate to determine % reduction in erosion necessary to support beneficial uses.

Sinker Creek Segments

1. Diamond Creek to Snake River

Succor Creek

Headwaters to Granite Creek — Segment Length → 6.36 miles

Segment #	Ave Slope HT (ft)	Bank Length (ft)	A_E (ft^2)	R_{LR}	D_B
1	3.47	100	346.7	0.034	110
2	3.52	200	703.3		
3	2.35	100	235.0		
4	1.25	250	312.5		
5	0.50	250	125.0		
6			0.0		
7			0.0		
8			0.0		
9			0.0		
10			0.0		
		900	1722.5		
			Total Area		

$E = [A_E * R_{LR} * D_B]/2000$

3.2	tons/year	Bank erosion rate at sampled reach
18.90	tons/mile/year	Bank erosion rate per mile
120.18	tons/year	Total erosion from segment per year

This site is considered the reference condition for the remainder of Succor Creek.
The banks are 85% stable and the percent surface fines in riffles is 18%, which is below the target of 28%

Slope Heights

Seg 1	Seg 2	Seg 3	Seg 4	Seg 5
3	3.1	1.2	0.5	1.3
5	6	1.7	0.9	0.5
2.5	5.2	2.3	1.6	0.6
4	2.1	2.3	1.6	0.2
3.2	3.7	2.4	1.8	0.2
3.1	1	4.2	1.1	0.2

Succor Creek

Granite Creek to Trib at T3S, R4W, Sec 1 Segment Length → 2.97 miles

Segment #	Ave Slope HT (ft)	Bank Length (ft)	A_E (ft^2)	R_{LR}	D_B	Target R_{LR}
1	4.42	180	795.0	0.2	110	0.034
2	3.91	231	902.8			(85% BS)
3	3.11	195	606.9			
4	3.49	210	733.3			
5	3.39	210	712.3			
6	4.23	84	354.9			
7			0.0			
8			0.0			
9			0.0			
10			0.0			
		1110	4105.2			
			Total Area			

$E = [A_E * R_{LR} * D_B]/2000$

45.2	tons/year	Bank erosion rate at sampled reach
214.80	tons/mile/year	Bank erosion rate per mile
637.96	tons/year	Total erosion from segment per year
7.7	tons/year	Target erosion rate at sampled reach
36.52	tons/mile/year	Target bank erosion rate per mile
108.45	tons/year	Target total erosion from segment per year
178.28	tons/mile/year	Load Reduction that will be achieved at 85% BS
83.00	Percent Reduction	

Slope Heights

Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6
3.6	2.9	3.3	1.6	1.9	5.5
3.9	2.9	3.3	3.3	4.2	5.2
3.9	2.9	3.3	6.6	2.9	2.3
3.9	3.6	4.3	1.9	3.6	3.9
4.3	3.6	3.9	1.9	2.6	
10.2	5.5	2.6	1.9	5.2	
3.9	6.9	2.9	1.9	2.3	
3.9	4.3	1.3	1.9	2.3	
4.6	2.9		1.3	2.3	
2.9	3.9		2.6	6.2	
3.3	2.6		5.2	4.6	
4.6	4.9		11.8	2.6	

Succor Creek

Tributary at T3S, R4W, Sec 1 to Reservoir Segment Length → 6.67 miles

Segment #	Ave Slope HT (ft)	Bank Length (ft)	A_E (ft^2)	R_{LR}	D_B	Target R_{LR}
1	1.85	42	77.7	0.024	110	0.034
2	2.62	291	761.5			(85% BS)
3	1.16	213	247.4			
4	1.61	247	396.8			
5			0.0			
6			0.0			
7			0.0			
8			0.0			
9			0.0			
10			0.0			
		793	1483.4			
			Total Area			

Slope Heights

Seg 1	Seg 2	Seg 3	Seg 4
2.9	2.7	1	1.14
2.7	1	0.82	1.8
1.3	4.6	1.37	2.9
1.6	1.8	1.5	1.8
1.6	2.5	1.14	1
1	3.1	1.14	1

$E = [A_E * R_{LR} * D_B]/2000$

2.0	tons/year	Bank erosion rate at sampled reach
13.04	tons/mile/year	Bank erosion rate per mile
86.96	tons/year	Total erosion from segment per year
2.8	tons/year	Target erosion rate at sampled reach
18.47	tons/mile/year	Target bank erosion rate per mile
123.20	tons/year	Target total erosion from segment per year
-5.43	tons/mile/year	Load Reduction that will be achieved at 85% BS
-41.67	Percent Reduction	

No Reduction Necessary in this reach

Succor Creek

Reservoir Outlet to Idaho/Oregon Line Segment Length → 4.42 miles

Segment #	Ave Slope HT (ft)	Bank Length (ft)	A_E (ft^2)	R_{LR}	D_B	Target R_{LR}
1	3.54	324	1145.8	0.149	110	0.034
2	4.80	90	432.0			(85% BS)
3	4.47	90	402.0			
4	4.26	348	1481.9			
5	3.84	210	805.6			
6			0.0			
7			0.0			
8			0.0			
9			0.0			
10			0.0			
		1062	4267.3			
			Total Area			

$E = [A_E * R_{LR} * D_B]/2000$

35.0	tons/year	Bank erosion rate at sampled reach
173.87	tons/mile/year	Bank erosion rate per mile
768.49	tons/year	Total erosion from segment per year
8.0	tons/year	Target erosion rate at sampled reach
39.67	tons/mile/year	Target bank erosion rate per mile
175.36	tons/year	Target total erosion from segment per year
134.19	tons/mile/year	Load Reduction that will be achieved at 85% BS
77.18	Percent Reduction	

Slope Heights

Seg 1	Seg 2	Seg 3	Seg 4	Seg 5
3.9	3.9	10.5	1.9	5.2
4.6	3.9	2.3	2.3	5.2
3.3	9.8	2.3	5.9	4.2
3.6	1.6	2.3	2.9	4.6
4.6		8.8	12.4	2.9
2.6		3.9	2.6	1.9
3.6		3.3	5.2	1.6
2.3		2.6	2.6	1.6
4.2		4.2	5.9	1.6
1.6			1.9	4.6
4.6			1.9	8.8
			5.6	

Castle Creek

Upper Section — Segment Length → 3.5 miles

Segment #	Ave Slope HT (ft)	Bank Length (ft)	A_E (ft^2)	R_{LR}	D_B	Target R_{LR}
1	1.20	87	104.4	0.05	110	0.05
2	2.00	18	36.0			(85% BS)
3	2.18	51	111.2			
4	2.02	90	181.5			
5	1.47	75	110.0			
6	2.25	63	141.8			
7	1.87	99	185.3			
8	4.28	57	244.2			
9	4.18	78	326.3			
10	4.13	87	359.6			
11	3.00	54	162.0			
12	5.68	84	477.1			
13	5.93	69	408.8			
14	1.65	156	258.1			
15	0.76	51	38.8			
16	4.19	75	314.0			
17	4.83	60	289.8			
		1254	3748.8 Total Area			

$E = [A_E * R_{LR} * D_B]/2000$

10.3	tons/year	Bank erosion rate at sampled reach
43.41	tons/mile/year	Bank erosion rate per mile
151.92	tons/year	Total erosion from segment per year
10.3	tons/year	Target erosion rate at sampled reach
43.41	tons/mile/year	Target bank erosion rate per mile
151.92	tons/year	Target total erosion from segment per year
0.00	tons/mile/year	Load Reduction that will be achieved at 85% BS
0.00	Percent Reduction	

Slope Heights

Seg 1	Seg 2	Seg 3	Seg 4	Seg 5	Seg 6	Seg 7	Seg 8	Seg 9	Seg 10
0.4	1.9	2	1.7	2	2	1.1	4	2	3
1.6	1.2	2.8	1	2	2	1.1	1	5	4.4
0.6	3	1.6	1	1.1	1.4	1.1	5.6	2.9	11
1.8	1.6	1	3.9	1	3.1	1.1	7	9	1.6
0.6	2.3	3.5	3.4	2.2	2	4.1	3.1	1.4	3.7
2.2			1.1	0.5	3	1	5	4.8	1.1
						3.6			

Seg 11	Seg 12	Seg 13	Seg 14	Seg 15	Seg 16	Seg 17
1	1.4	5	2.5	0.1	7.11	1
1	6	12.1	1.4	1	1.4	1
1.7	2	4	2	1	5.9	1.4
3	16	2.6	1.2	0.5	1.6	3
9	3		4.4	1.2	2	4
2.3			1.2		7.11	9
			1.4			6
			0.11			7
			2			9
			1.2			6.9
			1.1			
			1.4			
			1.6			

Castle Creek

Middle Section — Segment Length → 3.5 miles

Segment #	Ave Slope HT (ft)	Bank Length (ft)	A_E (ft^2)	R_{LR}	D_B	Target R_{LR}
1	1.00	1638	1638.0	0.11	110	0.05
2	3.60	1600	5760.0			(85% BS)
3	1.00	1600	1600.0			
4						
5						
6						
7						
8						
9						
10						
		4838	8998.0 Total Area			

$E = [A_E * R_{LR} * D_B]/2000$

54.4	tons/year	Bank erosion rate at sampled reach
59.41	tons/mile/year	Bank erosion rate per mile
207.94	tons/year	Total erosion from segment per year
43.41	tons/mile/year	Target bank erosion rate per mile
16.00	tons/mile/year	Load Reduction that will be achieved at 85% BS
26.93	Percent Reduction	

Castle Creek

Lower Section

Segment Length → 3 miles

Segment #	Ave Slope HT (ft)	Bank Length (ft)	A_E (ft^2)	R_{LR}	D_B	Target R_{LR}
1	1.20	78	93.6	0.046	110	0.05
2	0.63	216	136.8			(85% BS)
3	0.99	153	150.8			
4	0.98	117	115.1			
5						
6						
7						
8						
9						
10						
		564	496.3			
			Total Area			

$E = [A_E * R_{LR} * D_B]/2000$

1.3	tons/year	Bank erosion rate at sampled reach
11.75	tons/mile/year	Bank erosion rate per mile
35.26	tons/year	Total erosion from segment per year
43.41	tons/mile/year	Target bank erosion rate per mile
0.00	Percent Reduction	

Slope Heights

Seg 1	Seg 2	Seg 3	Seg 4
0.5	0.5	1	0.8
1.2	1.4	0.8	1
0.8	0.4	0.8	0.6
3	0.5	1.4	1.3
0.8	0.5	0.5	0.5
0.9	0.5	1	1.7
		1.4	

Castle Creek

Lower Section — Segment Length → 2.5 miles

Segment #	Ave Slope HT (ft)	Bank Length (ft)	A_E (ft^2)	R_{LR}	D_B	Target R_{LR}
1	5.28	156	823.7	0.11	110	0.05
2	3.04	272	826.9			(85% BS)
3	3.90	240	936.0			
4						
5						
6						
7						
8						
9						
10						
		668	2586.6			
			Total Area			

$E = [A_E * R_{LR} * D_B]/2000$

15.6	tons/year	Bank erosion rate at sampled reach
123.69	tons/mile/year	Bank erosion rate per mile
309.23	tons/year	Total erosion from segment per year
43.41	tons/mile/year	Target bank erosion rate per mile
80.28	tons/mile/year	Load Reduction that will be achieved at 85% BS
64.90	Percent Reduction	

Sinker Creek

Diamond Creek to Snake River | Segment Length | 10 miles | actual 10.77 | *

Segment #	Ave Slope HT (ft)	Bank Length (ft)	A_E (ft^2)	R_{LR}	D_B	Target R_{LR}
1	2.50	26400	66000.0	0.044	110	0.044
2	2.80	7920	22176.0	0.031	110	(85% BS)
3	2.60	7920	20592.0	0.085	110	
4	2.30	10560	24288.0	0.044	110	
Total		52800	133056.0 Total Area			

Slope Heights

Seg 1	Seg 2	Seg 3	Seg 4	Seg 5
3.9	3.9	10.5	1.9	5.2
4.6	3.9	2.3	2.3	5.2
3.3	9.8	2.3	5.9	4.2
1.6			1.9	4.6
4.6			1.9	8.8
			5.6	

$E = [A_E * R_{LR} * D_B]/2000$

352.6	tons/year	Bank erosion rate at sampled reach
35.26	tons/mile/year	Bank erosion rate per mile
352.57	tons/year	Total erosion from segment per year

322.0	tons/year	Target erosion rate at sampled reach
32.20	tons/mile/year	Target bank erosion rate per mile
322.00	tons/year	Target total erosion from segment per year

3.06	tons/mile/year	Load Reduction that will be achieved at 85% BS
8.67	Percent Reduction	

Appendix I. SSTEMP Model Inputs and Outputs – Model Run Sheets

The analyses that follow provide the data used to populate Table 53 in the TMDL chapter of this document. Appendix G contains the specific information regarding the derivation of the SSTEMP input variables.

The input variables for each of the SSTEMP model runs used in this TMDL are shown in this appendix. The SSTEMP model interface is included as Figure 1 in this appendix to illustrate where each of the respective input variables fits into the model interface. The variables within Figure 1 do not represent any of the Mid Snake River/Succor Creek data.

Succor Creek Segments

1. Headwaters to Berg Mine: May-June
2. Berg Mine to Chipmunk Meadows: May-June
3. Succor Creek Reservoir to Oregon Line: May-August

Sinker Creek Segments

1. Diamond Creek to Snake River: July

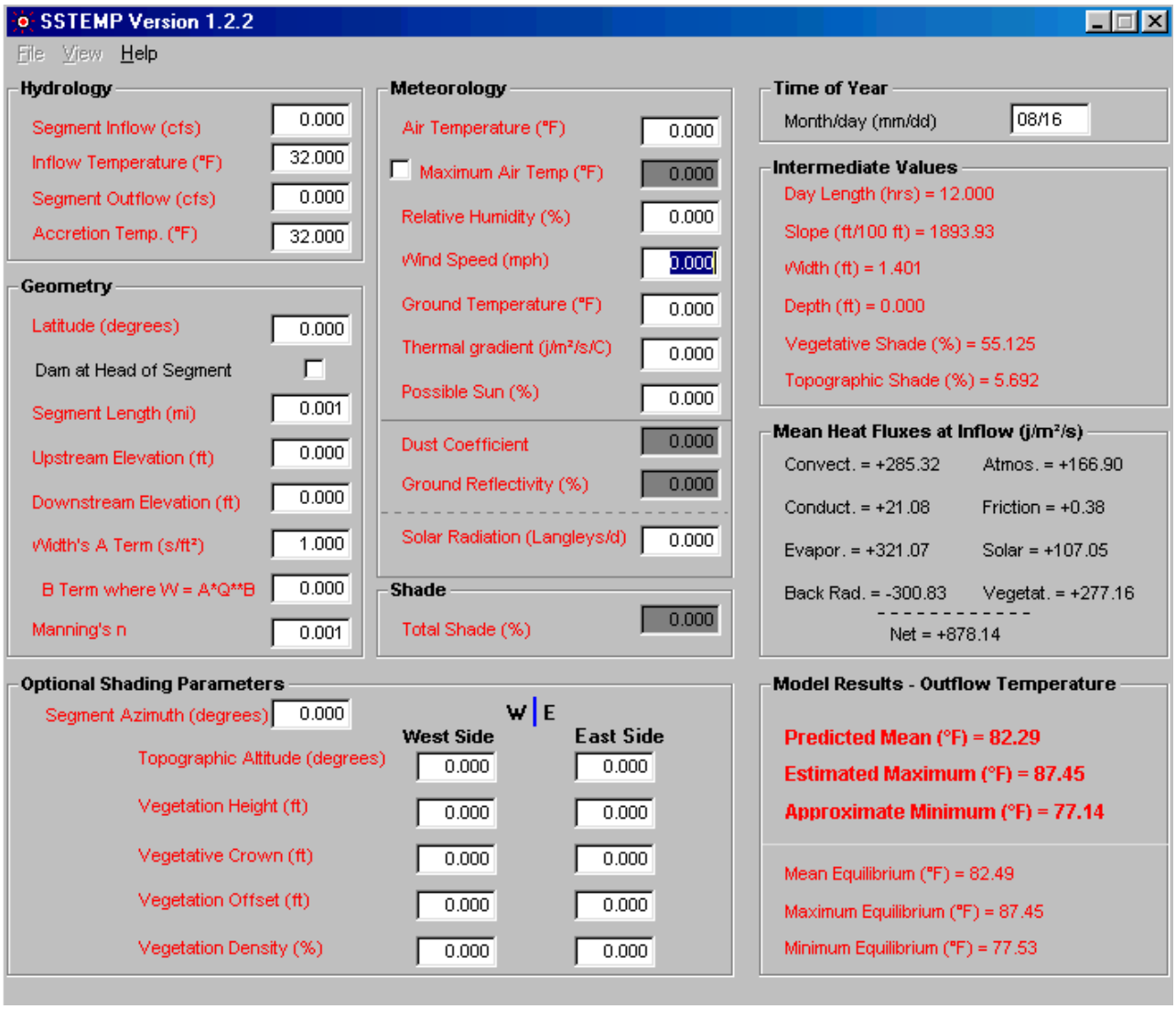


Figure 1. SSTEMP model interface: (values do not represent any of the Mid Snake River/Succor Creek data)

"SSTEMP (1.2.2) ","09/25/2002 10:27 am"

Succor Creek: "HW to Berg Mine - May - Existing"

"English",	"Segment Inflow (cfs)",	"0.000"
"International",	"Inflow Temperature (°C)",	"6.000"
"English",	"Segment Outflow (cfs)",	"21.500"
"English",	"Accretion Temp. (°F)",	"47.850"
"English",	"Latitude (degrees)",	"42.972"
"English",	"Segment Length (mi)",	"5.550"
"English",	"Upstream Elevation (ft)",	"6560.99"
"English",	"Downstream Elevation (ft)",	"5577.00"
"English",	"Width's A Term (s/ft²)",	"12.999"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"53.600"
"English",	"Relative Humidity (%)",	"56.500"
"English",	"Wind Speed (mph)",	"9.400"
"English",	"Ground Temperature (°F)",	"47.850"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"71.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"563.132"
"English",	"Total Shade (%)",	"15.529"
"English",	"Segment Azimuth (degrees)",	"-44.977"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"15.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"15.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (°F)",	"57.386"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Unchecked"
"Solar Radiation","Disabled"
"Total Shade","Disabled"
"Month/day","05/01"

"Predicted Mean (°C) = 10.42"
"Estimated Maximum (°F) = 61.57"
"Approximate Minimum (°F) = 39.94"
"Mean Equilibrium (°F) = 57.76"
"Maximum Equilibrium (°F) = 68.15"
"Minimum Equilibrium (°F) = 47.37"

SSTEMP (1.2.2) ","09/27/2002 09:20 am"

Succor Creek: "HW to Berg Mine - May - Allocation"

"English", "Segment Inflow (cfs)", "0.000"
"International", "Inflow Temperature (˚C)", "6.000"
"English", "Segment Outflow (cfs)", "21.500"
"English", "Accretion Temp. (˚F)", "47.850"
"English", "Latitude (degrees)", "42.972"
"English", "Segment Length (mi)", "5.550"
"English", "Upstream Elevation (ft)", "6560.99"
"English", "Downstream Elevation (ft)", "5577.00"
"English", "Width's A Term (s/ft²)", "12.999"
"English", " B Term where W = A*Q**B", "0.000"
"English", "Manning's n", "0.035"
"English", "Air Temperature (˚F)", "53.600"
"English", "Relative Humidity (%)", "56.500"
"English", "Wind Speed (mph)", "9.400"
"English", "Ground Temperature (˚F)", "47.850"
"English", "Thermal gradient (j/m²/s/C)", "1.650"
"English", "Possible Sun (%)", "71.000"
"English", "Dust Coefficient", "6.000"
"English", "Ground Reflectivity (%)", "15.000"
"English", "Solar Radiation (Langleys/d)", "563.132"
"English", "Total Shade (%)", "55.000"
"English", "Segment Azimuth (degrees)", "-44.977"

"West Side Parameters"
"English", "Topographic Altitude (degrees)", "15.000"
"English", "Vegetation Height (ft)", "13.000"
"English", "Vegetative Crown (ft)", "10.000"
"English", "Vegetation Offset (ft)", "5.000"
"English", "Vegetation Density (%)", "22.500"

"East Side Parameters"
"English", "Topographic Altitude (degrees)", "15.000"
"English", "Vegetation Height (ft)", "13.000"
"English", "Vegetative Crown (ft)", "10.000"
"English", "Vegetation Offset (ft)", "5.000"
"English", "Vegetation Density (%)", "22.500"
"English", " Maximum Air Temp (˚F)", "57.386"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (˚F)","Unchecked"
"Solar Radiation","Disabled"
"Total Shade","Enabled"
"Month/day","05/01"

"Predicted Mean (˚C) = 9.52"
"Estimated Maximum (˚F) = 55.35"
"Approximate Minimum (˚F) = 42.93"
"Mean Equilibrium (˚F) = 52.57"
"Maximum Equilibrium (˚F) = 59.69"
"Minimum Equilibrium (˚F) = 45.46"

"SSTEMP (1.2.2) ","09/25/2002 10:30 am"

Succor Creek: "HW to Berg Mine - June - Existing"

"English",	"Segment Inflow (cfs)",	"0.000"
"International",	"Inflow Temperature (˚C)",	"6.000"
"English",	"Segment Outflow (cfs)",	"19.670"
"English",	"Accretion Temp. (˚F)",	"47.850"
"English",	"Latitude (degrees)",	"42.972"
"English",	"Segment Length (mi)",	"5.550"
"English",	"Upstream Elevation (ft)",	"6560.99"
"English",	"Downstream Elevation (ft)",	"5577.00"
"English",	"Width's A Term (s/ft²)",	"12.999"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (˚F)",	"61.200"
"English",	"Relative Humidity (%)",	"51.500"
"English",	"Wind Speed (mph)",	"9.000"
"English",	"Ground Temperature (˚F)",	"47.850"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"76.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"647.966"
"English",	"Total Shade (%)",	"14.465"
"English",	"Segment Azimuth (degrees)",	"-44.977"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"15.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"15.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (˚F)",	"65.239"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (˚F)","Unchecked"
"Solar Radiation","Disabled"
"Total Shade","Disabled"
"Month/day","06/01"

"Predicted Mean (˚C) = 11.89"
"Estimated Maximum (˚F) = 65.46"
"Approximate Minimum (˚F) = 41.33"
"Mean Equilibrium (˚F) = 64.35"
"Maximum Equilibrium (˚F) = 73.59"
"Minimum Equilibrium (˚F) = 55.11"

"SSTEMP (1.2.2) ","09/27/2002 09:20 am"

Succor Creek: "HW to Berg Mine - June - Allocation"

"English",	"Segment Inflow (cfs)",	"0.000"
"International",	"Inflow Temperature (°C)",	"6.000"
"English",	"Segment Outflow (cfs)",	"19.670"
"English",	"Accretion Temp. (°F)",	"47.850"
"English",	"Latitude (degrees)",	"42.972"
"English",	"Segment Length (mi)",	"5.550"
"English",	"Upstream Elevation (ft)",	"6560.99"
"English",	"Downstream Elevation (ft)",	"5577.00"
"English",	"Width's A Term (s/ft²)",	"12.999"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"61.200"
"English",	"Relative Humidity (%)",	"51.500"
"English",	"Wind Speed (mph)",	"9.000"
"English",	"Ground Temperature (°F)",	"47.850"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"76.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"647.966"
"English",	"Total Shade (%)",	"55.000"
"English",	"Segment Azimuth (degrees)",	"-44.977"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"15.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"15.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (°F)",	"65.239"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Unchecked"
"Solar Radiation","Disabled"
"Total Shade","Enabled"
"Month/day","06/01"

"Predicted Mean (°C) = 10.67"
"Estimated Maximum (°F) = 58.21"
"Approximate Minimum (°F) = 44.19"
"Mean Equilibrium (°F) = 58.61"
"Maximum Equilibrium (°F) = 65.05"
"Minimum Equilibrium (°F) = 52.18"

"SSTEMP (1.2.2) ","09/25/2002 10:34 am"

Succor Creek: "Berg Mine to Chipmunk - May - Existing"

"English",	"Segment Inflow (cfs)",	"21.500"
"International",	"Inflow Temperature (°C)",	"10.010"
"English",	"Segment Outflow (cfs)",	"29.300"
"English",	"Accretion Temp. (°F)",	"47.850"
"English",	"Latitude (degrees)",	"43.000"
"English",	"Segment Length (mi)",	"3.050"
"English",	"Upstream Elevation (ft)",	"5577.00"
"English",	"Downstream Elevation (ft)",	"5250.00"
"English",	"Width's A Term (s/ft²)",	"14.000"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"53.590"
"English",	"Relative Humidity (%)",	"56.500"
"English",	"Wind Speed (mph)",	"9.400"
"English",	"Ground Temperature (°F)",	"47.850"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"71.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"561.849"
"English",	"Total Shade (%)",	"13.991"
"English",	"Segment Azimuth (degrees)",	"-45.000"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"10.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"10.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (°F)",	"57.377"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Unchecked"
"Solar Radiation","Disabled"
"Total Shade","Disabled"
"Month/day","05/01"

"Predicted Mean (°C) = 10.62"
"Estimated Maximum (°F) = 60.82"
"Approximate Minimum (°F) = 41.40"
"Mean Equilibrium (°F) = 59.54"
"Maximum Equilibrium (°F) = 69.68"
"Minimum Equilibrium (°F) = 49.40"

"SSTEMP (1.2.2) ","09/27/2002 09:21 am"

Succor Creek: "Berg Mine to Chipmunk - May - Allocation"

"English",	"Segment Inflow (cfs)",	"21.500"
"International",	"Inflow Temperature (°C)",	"10.010"
"English",	"Segment Outflow (cfs)",	"29.300"
"English",	"Accretion Temp. (°F)",	"47.850"
"English",	"Latitude (degrees)",	"43.000"
"English",	"Segment Length (mi)",	"3.050"
"English",	"Upstream Elevation (ft)",	"5577.00"
"English",	"Downstream Elevation (ft)",	"5250.00"
"English",	"Width's A Term (s/ft²)",	"14.000"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"53.590"
"English",	"Relative Humidity (%)",	"56.500"
"English",	"Wind Speed (mph)",	"9.400"
"English",	"Ground Temperature (°F)",	"47.850"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"71.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"561.849"
"English",	"Total Shade (%)",	"55.000"
"English",	"Segment Azimuth (degrees)",	"-45.000"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"10.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"10.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (°F)",	"57.377"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Unchecked"
"Solar Radiation","Disabled"
"Total Shade","Enabled"
"Month/day","05/01"

"Predicted Mean (°C) = 10.10"
"Estimated Maximum (°F) = 55.55"
"Approximate Minimum (°F) = 44.80"
"Mean Equilibrium (°F) = 54.38"
"Maximum Equilibrium (°F) = 61.24"
"Minimum Equilibrium (°F) = 47.51"

"SSTEMP (1.2.2) ","09/25/2002 10:35 am"

Succor Creek: "Berg Mine to Chipmunk - June - Existing"

"English",	"Segment Inflow (cfs)",	"19.670"
"International",	"Inflow Temperature (°C)",	"11.300"
"English",	"Segment Outflow (cfs)",	"27.300"
"English",	"Accretion Temp. (°F)",	"47.850"
"English",	"Latitude (degrees)",	"43.000"
"English",	"Segment Length (mi)",	"3.050"
"English",	"Upstream Elevation (ft)",	"5577.00"
"English",	"Downstream Elevation (ft)",	"5250.00"
"English",	"Width's A Term (s/ft²)",	"14.000"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"61.200"
"English",	"Relative Humidity (%)",	"51.500"
"English",	"Wind Speed (mph)",	"9.000"
"English",	"Ground Temperature (°F)",	"47.850"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"76.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"646.503"
"English",	"Total Shade (%)",	"13.033"
"English",	"Segment Azimuth (degrees)",	"-45.000"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"10.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"10.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (°F)",	"65.239"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Unchecked"
"Solar Radiation","Disabled"
"Total Shade","Disabled"
"Month/day","06/01"

"Predicted Mean (°C) = 12.17"
"Estimated Maximum (°F) = 64.64"
"Approximate Minimum (°F) = 43.16"
"Mean Equilibrium (°F) = 65.86"
"Maximum Equilibrium (°F) = 74.90"
"Minimum Equilibrium (°F) = 56.81"

"SSTEMP (1.2.2) ","09/27/2002 09:22 am"

Succor Creek: "Berg Mine to Chipmunk - June - Allocation"

"English",	"Segment Inflow (cfs)",	"19.670"
"International",	"Inflow Temperature (°C)",	"11.300"
"English",	"Segment Outflow (cfs)",	"27.300"
"English",	"Accretion Temp. (°F)",	"47.850"
"English",	"Latitude (degrees)",	"43.000"
"English",	"Segment Length (mi)",	"3.050"
"English",	"Upstream Elevation (ft)",	"5577.00"
"English",	"Downstream Elevation (ft)",	"5250.00"
"English",	"Width's A Term (s/ft²)",	"14.000"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"61.200"
"English",	"Relative Humidity (%)",	"51.500"
"English",	"Wind Speed (mph)",	"9.000"
"English",	"Ground Temperature (°F)",	"47.850"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"76.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"646.503"
"English",	"Total Shade (%)",	"55.000"
"English",	"Segment Azimuth (degrees)",	"-45.000"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"10.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"10.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (°F)",	"65.239"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Unchecked"
"Solar Radiation","Disabled"
"Total Shade","Enabled"
"Month/day","06/01"

"Predicted Mean (°C) = 11.46"
"Estimated Maximum (°F) = 58.60"
"Approximate Minimum (°F) = 46.64"
"Mean Equilibrium (°F) = 60.14"
"Maximum Equilibrium (°F) = 66.37"
"Minimum Equilibrium (°F) = 53.91"

"SSTEMP (1.2.2) ","09/25/2002 10:43 am"

Succor Creek: "Reservoir to Oregon - May - Existing"

"English",	"Segment Inflow (cfs)",	"33.500"
"International",	"Inflow Temperature (°C)",	"9.160"
"English",	"Segment Outflow (cfs)",	"35.500"
"English",	"Accretion Temp. (°F)",	"45.980"
"English",	"Latitude (degrees)",	"43.000"
"English",	"Segment Length (mi)",	"4.420"
"English",	"Upstream Elevation (ft)",	"4600.00"
"English",	"Downstream Elevation (ft)",	"4220.00"
"English",	"Width's A Term (s/ft²)",	"16.400"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"51.880"
"English",	"Relative Humidity (%)",	"56.500"
"English",	"Wind Speed (mph)",	"9.400"
"English",	"Ground Temperature (°F)",	"45.980"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"71.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"561.410"
"English",	"Total Shade (%)",	"14.262"
"English",	"Segment Azimuth (degrees)",	"45.000"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (°F)",	"55.667"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Checked"
"Solar Radiation","Disabled"
"Total Shade","Disabled"
"Month/day","05/01"

"Predicted Mean (°C) = 10.29"
"Estimated Maximum (°F) = 59.64"
"Approximate Minimum (°F) = 41.39"
"Mean Equilibrium (°F) = 58.29"
"Maximum Equilibrium (°F) = 68.58"
"Minimum Equilibrium (°F) = 48.01"

"SSTEMP (1.2.2) ","09/27/2002 09:22 am"

Succor Creek: "Reservoir to Oregon - May - Allocation"

"English",	"Segment Inflow (cfs)",	"33.500"
"International",	"Inflow Temperature (°C)",	"9.160"
"English",	"Segment Outflow (cfs)",	"35.500"
"English",	"Accretion Temp. (°F)",	"45.980"
"English",	"Latitude (degrees)",	"43.000"
"English",	"Segment Length (mi)",	"4.420"
"English",	"Upstream Elevation (ft)",	"4600.00"
"English",	"Downstream Elevation (ft)",	"4220.00"
"English",	"Width's A Term (s/ft²)",	"16.400"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"51.880"
"English",	"Relative Humidity (%)",	"56.500"
"English",	"Wind Speed (mph)",	"9.400"
"English",	"Ground Temperature (°F)",	"45.980"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"71.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"561.410"
"English",	"Total Shade (%)",	"55.000"
"English",	"Segment Azimuth (degrees)",	"45.000"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Segment Azimuth (degrees)",	"17.000"
"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Checked"
"Solar Radiation","Disabled"
"Total Shade","Enabled"
"Month/day","05/01"

"Predicted Mean (°C) = 9.63"
"Estimated Maximum (°F) = 54.42"
"Approximate Minimum (°F) = 44.23"
"Mean Equilibrium (°F) = 53.12"
"Maximum Equilibrium (°F) = 60.09"
"Minimum Equilibrium (°F) = 46.15"

"SSTEMP (1.2.2) ","09/25/2002 10:42 am"

Succor Creek: "Reservoir to Oregon - June - Existing"

"English",	"Segment Inflow (cfs)",	"31.500"
"International",	"Inflow Temperature (°C)",	"9.610"
"English",	"Segment Outflow (cfs)",	"33.500"
"English",	"Accretion Temp. (°F)",	"45.980"
"English",	"Latitude (degrees)",	"43.000"
"English",	"Segment Length (mi)",	"4.420"
"English",	"Upstream Elevation (ft)",	"4600.00"
"English",	"Downstream Elevation (ft)",	"4220.00"
"English",	"Width's A Term (s/ft²)",	"16.400"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"59.590"
"English",	"Relative Humidity (%)",	"51.500"
"English",	"Wind Speed (mph)",	"9.000"
"English",	"Ground Temperature (°F)",	"45.980"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"76.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"646.036"
"English",	"Total Shade (%)",	"13.107"
"English",	"Segment Azimuth (degrees)",	"45.000"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (°F)",	"76.000"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Checked"
"Solar Radiation","Disabled"
"Total Shade","Disabled"
"Month/day","06/01"

"Predicted Mean (°C) = 11.63"
"Estimated Maximum (°F) = 67.66"
"Approximate Minimum (°F) = 38.20"
"Mean Equilibrium (°F) = 64.79"
"Maximum Equilibrium (°F) = 77.70"
"Minimum Equilibrium (°F) = 51.88"

"SSTEMP (1.2.2) ","09/27/2002 09:23 am"

Succor Creek: "Reservoir to Oregon - June - Allocation"

"English",	"Segment Inflow (cfs)",	"31.500"
"International",	"Inflow Temperature (°C)",	"9.610"
"English",	"Segment Outflow (cfs)",	"33.500"
"English",	"Accretion Temp. (°F)",	"45.980"
"English",	"Latitude (degrees)",	"43.000"
"English",	"Segment Length (mi)",	"4.420"
"English",	"Upstream Elevation (ft)",	"4600.00"
"English",	"Downstream Elevation (ft)",	"4220.00"
"English",	"Width's A Term (s/ft²)",	"16.400"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"59.590"
"English",	"Relative Humidity (%)",	"51.500"
"English",	"Wind Speed (mph)",	"9.000"
"English",	"Ground Temperature (°F)",	"45.980"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"76.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"646.036"
"English",	"Total Shade (%)",	"55.000"
"English",	"Segment Azimuth (degrees)",	"45.000"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (°F)",	"76.000"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Checked"
"Solar Radiation","Disabled"
"Total Shade","Enabled"
"Month/day","06/01"

"Predicted Mean (°C) = 10.76"
"Estimated Maximum (°F) = 61.64"
"Approximate Minimum (°F) = 41.10"
"Mean Equilibrium (°F) = 59.04"
"Maximum Equilibrium (°F) = 69.95"
"Minimum Equilibrium (°F) = 48.13"

"SSTEMP (1.2.2) ","09/25/2002 10:47 am"

Succor Creek: "Reservoir to Oregon - July - Existing"

"English",	"Segment Inflow (cfs)",	"42.800"
"International",	"Inflow Temperature (°C)",	"13.500"
"English",	"Segment Outflow (cfs)",	"44.800"
"English",	"Accretion Temp. (°F)",	"45.980"
"English",	"Latitude (degrees)",	"43.000"
"English",	"Segment Length (mi)",	"4.420"
"English",	"Upstream Elevation (ft)",	"4600.00"
"English",	"Downstream Elevation (ft)",	"4220.00"
"English",	"Width's A Term (s/ft²)",	"16.400"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"68.200"
"English",	"Relative Humidity (%)",	"40.000"
"English",	"Wind Speed (mph)",	"8.400"
"English",	"Ground Temperature (°F)",	"45.980"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"87.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"703.562"
"English",	"Total Shade (%)",	"12.957"
"English",	"Segment Azimuth (degrees)",	"45.000"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (°F)",	"87.340"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Checked"
"Solar Radiation","Disabled"
"Total Shade","Disabled"
"Month/day","07/01"

"Predicted Mean (°C) = 14.86"
"Estimated Maximum (°F) = 73.06"
"Approximate Minimum (°F) = 44.42"
"Mean Equilibrium (°F) = 70.10"
"Maximum Equilibrium (°F) = 83.12"
"Minimum Equilibrium (°F) = 57.08"

"SSTEMP (1.2.2) ","09/25/2002 11:05 am"

Succor Creek: "Reservoir to Oregon - July - Allocation"

"English",	"Segment Inflow (cfs)",	"42.800"
"International",	"Inflow Temperature (°C)",	"13.500"
"English",	"Segment Outflow (cfs)",	"44.800"
"English",	"Accretion Temp. (°F)",	"45.980"
"English",	"Latitude (degrees)",	"43.000"
"English",	"Segment Length (mi)",	"4.420"
"English",	"Upstream Elevation (ft)",	"4600.00"
"English",	"Downstream Elevation (ft)",	"4220.00"
"English",	"Width's A Term (s/ft²)",	"16.400"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"68.200"
"English",	"Relative Humidity (%)",	"40.000"
"English",	"Wind Speed (mph)",	"8.400"
"English",	"Ground Temperature (°F)",	"45.980"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"87.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"703.562"
"English",	"Total Shade (%)",	"24.000"
"English",	"Segment Azimuth (degrees)",	"45.000"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (°F)",	"87.340"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Checked"
"Solar Radiation","Disabled"
"Total Shade","Enabled"
"Month/day","07/01"

"Predicted Mean (°F) = 58.40"
"Estimated Maximum (°F) = 71.59"
"Approximate Minimum (°F) = 45.20"
"Mean Equilibrium (°F) = 68.64"
"Maximum Equilibrium (°F) = 81.26"
"Minimum Equilibrium (°F) = 56.02"

"SSTEMP (1.2.2) ","09/25/2002 10:53 am"

Succor Creek: "Reservoir to Oregon - August - Existing"

"English",	"Segment Inflow (cfs)",	"10.740"
"International",	"Inflow Temperature (°C)",	"15.250"
"English",	"Segment Outflow (cfs)",	"12.700"
"English",	"Accretion Temp. (°F)",	"45.980"
"English",	"Latitude (degrees)",	"43.000"
"English",	"Segment Length (mi)",	"4.420"
"English",	"Upstream Elevation (ft)",	"4600.00"
"English",	"Downstream Elevation (ft)",	"4220.00"
"English",	"Width's A Term (s/ft²)",	"16.400"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"67.480"
"English",	"Relative Humidity (%)",	"40.000"
"English",	"Wind Speed (mph)",	"8.200"
"English",	"Ground Temperature (°F)",	"45.980"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"85.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"640.028"
"English",	"Total Shade (%)",	"13.767"
"English",	"Segment Azimuth (degrees)",	"45.000"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (°F)",	"86.310"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Checked"
"Solar Radiation","Disabled"
"Total Shade","Disabled"
"Month/day","08/01"

"Predicted Mean (°C) = 16.72"
"Estimated Maximum (°C) = 25.70"
"Approximate Minimum (°F) = 45.95"
"Mean Equilibrium (°F) = 66.93"
"Maximum Equilibrium (°F) = 81.02"
"Minimum Equilibrium (°F) = 52.84"

"SSTEMP (1.2.2) ","09/25/2002 11:05 am"

Succor Creek: "Reservoir to Oregon - August - Allocation"

"English",	"Segment Inflow (cfs)",	"10.740"
"International",	"Inflow Temperature (°C)",	"15.250"
"English",	"Segment Outflow (cfs)",	"12.700"
"English",	"Accretion Temp. (°F)",	"45.980"
"English",	"Latitude (degrees)",	"43.000"
"English",	"Segment Length (mi)",	"4.420"
"English",	"Upstream Elevation (ft)",	"4600.00"
"English",	"Downstream Elevation (ft)",	"4220.00"
"English",	"Width's A Term (s/ft²)",	"16.400"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"67.480"
"English",	"Relative Humidity (%)",	"40.000"
"English",	"Wind Speed (mph)",	"8.200"
"English",	"Ground Temperature (°F)",	"45.980"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"85.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"640.028"
"English",	"Total Shade (%)",	"53.000"
"English",	"Segment Azimuth (degrees)",	"45.000"

"West Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"

"East Side Parameters"

"English",	"Topographic Altitude (degrees)",	"17.000"
"English",	"Vegetation Height (ft)",	"13.000"
"English",	"Vegetative Crown (ft)",	"10.000"
"English",	"Vegetation Offset (ft)",	"5.000"
"English",	"Vegetation Density (%)",	"22.500"
"English",	" Maximum Air Temp (°F)",	"86.310"

"Dam at Head of Segment","Unchecked"
" Maximum Air Temp (°F)","Checked"
"Solar Radiation","Disabled"
"Total Shade","Enabled"
"Month/day","08/01"

"Predicted Mean (°F) = 59.20"
"Estimated Maximum (°F) = 71.55"
"Approximate Minimum (°F) = 46.85"
"Mean Equilibrium (°F) = 61.80"
"Maximum Equilibrium (°F) = 73.91"
"Minimum Equilibrium (°F) = 49.68"

"SSTEMP (1.2.2)
Sinker Creek
Diamond Creek to Snake River

"English",	"Segment Inflow (cfs)",	"4.000"
"International",	"Inflow Temperature (°C)",	"17.650"
"English",	"Segment Outflow (cfs)",	"4.0"
"English",	"Accretion Temp. (°F)",	"51.3"
"English",	"Latitude (degrees)",	"42"
"English",	"Segment Length (mi)",	"7.70"
"English",	"Upstream Elevation (m)",	"1000"
"English",	"Downstream Elevation (m)",	"750.00"
"English",	"Width's A Term (s/ft²)",	"10.39"
"English",	" B Term where W = A*Q**B",	"0.000"
"English",	"Manning's n",	"0.035"
"English",	"Air Temperature (°F)",	"78.00"
"English",	"Relative Humidity (%)",	"37.00"
"English",	"Wind Speed (mph)",	"8.400"
"English",	"Ground Temperature (°F)",	"51.3"
"English",	"Thermal gradient (j/m²/s/C)",	"1.650"
"English",	"Possible Sun (%)",	"87.000"
"English",	"Dust Coefficient",	"6.000"
"English",	"Ground Reflectivity (%)",	"15.000"
"English",	"Solar Radiation (Langleys/d)",	"647.966"
"English",	"Total Shade (%)",	"70.200"
"English",	"Segment Azimuth (degrees)",	"0."

"Dam at Head of Segment","checked"
" Maximum Air Temp (°F)","Unchecked"
"Solar Radiation","Disabled"
"Total Shade","Enabled"
"Month/day","07/16"
** Used July 16th because this was the day with the hottest instream temperature. Did not use July 12-14th because these days exceeded the MWMT. Modeled the latter half of June and July when exceedances occurred to see if the site potential shade would result in meeting the criteria (10% or less exceedances)

Appendix J. Response to Public Comments

This appendix documents the comments received during the 45-day comment period for the Middle Snake River/Succor Creek Subbasin Assessment and Total Maximum Daily Load. The comment period extended from January 13, 2003 to February 28, 2003. The original comments as well as DEQ's response to the comments are documented in the following response to comment matrix. In some instances the comment is summarized. In others, the exact comment is given.

Comments From: Ron Cunningham, President Succor Creek District Improvement Co. Received via mail: February 10, 2003	**DEQ Response:**
1) "I support the delisting of many of the streams suggested for delisting. DEQ seems to have made a diligent effort to gather and analyze data to support the conclusions reached."	DEQ acknowledges the support of de-listing many of the streams in the basin.
2) "Some effort was made to consider the unique attributes of each stream and its drainage. The acknowledgement of this in 'Best Achievable Temperature' for a standard on the stream to which it applies, is an excellent determination.	DEQ agrees that the use of Best Achievable Temperature addresses the unique attributes of each stream and its drainage. DEQ acknowledges support for using Best Achievable Temperature.
3) "The equal concentration allocation scenario seemed to be a very fair and equitable way to address where efforts to make reductions need to be made, and where efforts would have to most impact on meeting water quality standards."	DEQ acknowledges support for the equal concentration allocation scenario.
4) 2002 flow data for Succor Creek Reservoir were provided.	The flow data will be integrated into the Succor Creek portion of the subbasin assessment. The data are very helpful in further characterizing the reservoir outflows.
5) A typo on page 190 was noted. !0,984 should read 1.984.	The typo will be fixed.
Comments From: Ron Blake, District Conservationist Natural Resources Conservation Services Received via e-mail: January 30, 2003	**DEQ Response:**
1) "I need to go on record saying to delist the lower segment of Birch Creek is a mistake. Birch Creek is being used as an ag drain collecting sediment-laden wastewater from irrigated cropland that flows to the Snake River. I have been assisting a landowner adjacent to Birch Creek develop a conservation plan. I have seen Birch Creek water look like flowing chocolate. This past December 2002, I was onsite and noticed seep water flows present in that lower segment of Birch	The data that DEQ collected suggests that Birch Creek is intermittent. The flows during the non-irrigation period appear to be below 1 cfs. If there is evidence that Birch Creek is contributing loads of sediments or nutrients to the Snake River in amounts that cause impairment of beneficial uses to the Snake River then the stream will be subject to load allocations. DEQ would welcome any data that is available showing that Birch Creek flows above 1 cfs year round. Any data submitted will be used in

Creek. Would that qualify the lower segment to be a perennial stream? I began working at the Mountain Home Field Office August of 1995. In 1996 I did conservation planning on several properties East and West of Grandview. I observed many farms without sprinkler irrigation systems using flood irrigation and generating waste water laden with sediment draining to the Snake River. I would hope that area East and West of Grandview, which involves intensively farmed cropland, could be helped to reduce their non point source pollution impacts to the Snake River."	determining whether or not to delist Birch Creek in the next 303(d) listing process.
Comments From: James Truesdell, Chairman Canyon Soil Conservation District Received via mail: February 10, 2003	**DEQ Response:**
1) Pg. 12-23. "A question as why "Wildlife" was left out of the Subbasin Characteristics? Wildlife should be described to the same degree as "Fisheries". With the discussion on wildlife, wild horses need to be addressed to the damage they can cause to riparian areas and springs. Wild horses are not actively managed like range cattle; wild horses can come and go at their own pleasure. Some discussion of the management objectives of BLM for their wild horse populations should be incorporated into the Subbasin Assessment."	A discussion of BLM's management objectives for wild horse populations will be integrated into the subbasin assessment.
2) Pg. 27, Third Paragraph. "Discussion of natural erosion talks about gullies, but does not discuss wild horses and elk impacting riparian areas. Private citizens do not actively manage elk and wild horses; State and Federal agencies manage them."	A discussion of BLM's management objectives for wild horse populations will be integrated into the subbasin assessment.
3) Pg. 30. "Jump Creek is not in Canyon County. Why does DEQ choose to add parts of Canyon County to Jump Creek Subwatershed? Jump Creek comes out of the Owyhee foothills and not Canyon County. Please describe why you have chosen to include Canyon County. Your description of the Jump Creek watershed talks about everything in Owyhee County, but your map on page 31 shows both Owyhee and Canyon Counties?	This map will be corrected in the final document to show Jump Creek solely in Owyhee County.
4) Pg. 31. Figure 1.10 Jump Creek Land Use. "Why does DEQ choose to add parts of Canyon County to Jump Creek Subwatershed? Jump Creek comes out of the Owyhee foothills and not Canyon County. Please fix your maps or describe why you have chosen to include Canyon County. If DEQ deletes the Canyon County portions from the Jump Creek subwatershed, a new	This map will be corrected in the final document to show Jump Creek solely in Owyhee County.

subwatershed will need to be inserted into the document."	
5) Pg. 37. "Squaw Creek is not in Ada County. Why does DEQ choose to add parts of Ada County to Squaw Creek Subwatershed? Squaw Creek comes out of the Owyhee foothills and not Ada County. Please describe why you have chosen to include Ada County. Your description of the Squaw Creek watershed talks about everything in Owyhee County, but your map on page 31 shows both Owyhee and Ada Counties."	This map will be corrected in the final document to show Squaw Creek solely in Owyhee County.
6) Pg. 38. Figure 1.14 Squaw Creek Land Use. "Why does DEQ choose to add parts of Ada County to Squaw Creek Subwatershed? Squaw Creek comes out of the Owyhee foothills and not Ada County. Please fix your maps or describe why you have chosen to include Ada County. If DEQ deletes the Ada County portions from the Squaw Creek subwatershed, a new subwatershed will need to be inserted into the document."	This map will be corrected in the final document to show Squaw Creek solely in Owyhee County.
7) Pg. 40. "Where is a Figure for "Lower Succor Creek?"	An additional figure showing Lower Succor Creek will be inserted into the final document.
"Why is there not a subwatershed for everything that drains into the MidSnake reach? The MidSnake reaches are listed for pollutants, but the landuse maps are missing areas like Con Shea Basin or Murphy Flats in Owyhee County or the land in Elmore County next CJ Strike Reservoir. There is 570 plus acres of sprinkled cropland in Con Shea Basin north of Murphy, 6,500 acres of cropland at Murphy Flats and 13,000 plus acres of cropland in Elmore County. There is also landuse in between Hardtrigger and Reynolds Creeks along the river itself that drains into the Mid Snake."	The Mid Snake/Succor Creek Subbasin Assessment evaluated the beneficial use support status of the §303(d) listed subwatersheds only.
8) Pg. 44. First Paragraph, first sentence. "The sentence reads "The sparsely populated MidSnake River? Succor Creek watershed encompasses parts of Owyhee, Elmore and Canyon Counties." Parts of Ada County also flow into the watershed and need to be listed."	Ada County will be added to the sentence.
9) Pg. 44. Last Paragraph, last sentence. "Include Ada county and Ada Soil and Water Conservation District, Owyhee Soil Conservation District and Elmore Soil and Water Conservation District."	Ada county, Ada Soil and Water Conservation District, Owyhee Soil Conservation District and Elmore Soil and Water Conservation District will be added to the sentence.
10) Pg. 48. Table 5. Mid Snake River/Succor Creek Subbasin Designated Beneficial Uses. "List Succor Creek as Upper Succor Creek and Lower Succor Creek."	This change will be made in the final document.

11) Pg. 51. "Discussion of Natural factors affecting stream temperatures should state "Natural factors include, but are not limited to altitude, aspect, climate, weather, geothermal sources, riparian vegetation (shade), wildlife, and channel morphology (width and depth)."	DEQ will make this correction.
12) Pg. 85. Riparian Survey. "The survey was done by Idaho Soil Conservation Commission (ISCC), not the Idaho Soil Conservation Service."	DEQ will correct this error.
13) Pg. 86. "Fix the description of Figure 2.23 (Idaho Soil Conservation Commission 2002), not the Idaho Soil Conservation Service."	DEQ will correct this error
14) Pg. 109. Sediment. "The survey was done by Idaho Soil Conservation Commission (ISCC), not the Idaho Soil Conservation Service."	DEQ will correct this error.
15) Pg. 113. First Paragraph, First Sentence. "What is uncultivated scrub? Did DEQ mean rangeland?"	Yes, DEQ means rangeland.
16) Pg. 144. Fourth Paragraph, First Sentence. "Please include Ada County. Fourth Paragraph, Fourth Sentence. Owyhee SCD had an EQIP Priority Area for Jump Creek, Canyon SCD has had no state or federal project areas on the Mid Snake River/Succor Creek Watershed. Fourth Paragraph, Seventh Sentence. Add Ada SCD to the districts listed."	Ada SCD will be added to the districts listed.
17) Pg. 145. First Paragraph, First Sentence. "Change "federal Environmental Quality Incentives Program" to "USDA Environmental Quality Incentives Program."	The change to USDA Environmental Quality Incentives Program will be made.
18) Pg. 158. Third Paragraph. "Please review with Tonya Dombrowski the new wording from the Lower Snake/Hells Canyon TMDL for this paragraph. Here are the concerns that were voiced during the comment period for Lower Snake/Hells Canyon TMDL: Pgs. 245-246 . 3.2.3.1 Natural Sources. These two pages have many errors within this section. Idaho Soil Conservation Commission (ISCC) and Idaho Association of Soil Conservation District (IASCD) employees (Justin Krajewski and Chris Fischer) were contacted to give us information about pages 245 and 246 and these are their comments. The monitoring sites are USGS	The revised SR-HC TMDL background wording that addresses these comments will be incorporated into the document.

"gage"stations and are greater than 20 miles from the phosphorus mines currently operating. Two reservoirs on the Blackfoot River are above that USGS gage station near Blackfoot. Could the Blackfoot Reservoir be the source for nutrients? This question led to some bridge board sampling below it. Chris's bridge board sampling occurred on 4 sites on the Blackfoot River all below the Blackfoot Reservoir. Chris's wadeable stream sampling occurred at just 1 site on the Blackfoot River below the Lanes and Diamond creeks confluence which is greater than 10 miles above the USGS gage station at Henry. 1970's should be 1970s (plural not possessive) Landuses are "Agricultural, range, forest and urban are the major landuses within the subbasin (Figure 6)." not the activities described as timber harvest, farming, ranching, and livestock grazing. Isn't ranching and livestock grazing redundant? The Portneuf TMDL's greatest reductions in total phosphorus are required below the Pocatello WWTP. The reduction in sediment coming from non-irrigated cropland that has been enrolled in CRP may have had an effect on total phosphorus concentrations because TSS and TP are thought to be related in the Portneuf Subbasin. The Blackfoot River is not in the Portneuf River Subbasin and is not an area targeted for BMPs at this time. In fact there has been no formal implementation projects on private Ag land in the Blackfoot River Subbasin and implementation is far from complete, although about 15,000 acres have been enrolled in CRP over the last 15 years. However on public lands the USFS has completed implementation of riparian BMPs on Diamond Creek and IDFG has completed work on their property. Blackfoot TMDL (page 61) quotes are "The success of most of these programs and projects is unknown." and "Initiation of CRP program has likely been an important component to water quality improvement in the Blackfoot River	

Subbasin." Fischer, 2001 data is very limited. Fischer, P. reference is incorrect. Fischer emailed to the Pocatello IDEQ and no personal communication occurred. Several subwatersheds have not been targeted for implementation in the Portneuf River Subbasin. There have been five SAWQP projects, 1 WQPA project, 1 EQIP priority area and four 319 riparian projects out of 34 critical subwatersheds. None of our specific implementation for agricultural BMPs restores to natural conditions because we don't know what "natural conditions" are. We restore our values or beneficial uses such as primary contact recreation, salmonid spawning and cold water biota, and Ag water supply not "natural conditions". The total phosphorus target is 0.075 mg/L for the Portneuf TMDL and is similar to the Mid-Snake TMDL. Although the natural levels for nitrogen and phosphorus are unknown, assumptions can be made. Sediment: nutrient relationships should be looked at carefully. The total phosphorus target is 0.1 mg/L for the Blackfoot TMDL and is higher than the Portneuf and Mid-Snake TMDLs. Why there is 0.025 mg/L difference between the Blackfoot and Portneuf TMDLs is unknown? Both rivers flow into the Snake River and into American Falls Reservoir. "with the success realized in the Blackfoot River watershed" What success and what indicator? There have been 15,869 of non-irrigated cropland converted to 7,362 to CRP and another 8,179 acres planted to permanent pasture. Very few acres of cropland remain below the reservoir but thousand of acres are still farmed above the reservoir. The Blackfoot Reservoir isn't listed either. Pocatello IDEQ wrote in the Blackfoot TMDL, "The recommended target of 0.1 mg/l total phosphorus follows the EPA "Gold Book."	
19) Pg. 163. Second Paragraph. "Should read "While only the sources listed in table 47 received explicit LAs for bacteria, other nonpoint sources of	This change will be made in the final document.

bacteria loading to the stream, such as pasture lands in the floodplain, wildlife, wild horses, and feeding operations should be managed to prevent the movement of bacteria into the stream." 20) "The Lower Boise River DNA Bacteria study has proven that wildlife contribute to the bacteria loading within a watershed and should be mentioned. It is not all agriculture delivering bacteria to streams. Until the quantity of agricultural bacteria sources are known, all possible bacteria sources should be listed. 21) Pg. 170. Second Paragraph, Fifth Bullet, Second Sentence. "Besides dairies, IDA will inspect Animal Feeding Operations (AFOs)."	 DEQ acknowledges that agriculture is not the only source of bacteria to streams. Wildlife will be added as a potential source in the final document. AFOs will be added to the sentence.
Comments From: Zigmund M. Napkora, Hydrologist Bureau of Land Management Lower Snake River District Received via email: January 20, 2003	**DEQ Response:**
1) Page XV. "SS (suspended sediment) and/or SSC (suspended sediment concentration)" 2) Page 27, Paragraph 2,5. "Refer to Rosgen "C" channels as U-shaped. Type "F" channels are U-shaped. Type F channels in fine sediments are entrenched and disconnected from the floodplain and generally indicate a degraded system. Type C channels are meandering, bar-forming channels, with a floodplain. If these channels are U-shaped, they are probably not the appropriate channel type for the environmental setting." 3) Page 65, Paragraph 2. "Please include the reference to the Idaho Power study." 4) Page 81, Paragraph 3. "The third sentence refers to the IDFG letter in Appendix F. This sentence is an incorrect interpretation of the letter. Paragraph 3 implies that trout did not and do not spawn there because of low gradient and lack of habitat. The letter states that: "Although, we have no definitive data, I agree that the reaches outlined are unlikely to support salmonid spawning under **current conditions**. Historically, the lower reaches were likely used as seasonal migration corridors connecting upstream populations to the Snake River. Currently, there may be barriers to upstream migrants at some irrigation diversions. Given the low gradient and temperature regime, I suspect that the potential to support trout spawning is low, even if substantial habitat improvement occurred. Maintaining or enhancing suitability as	These acronyms will be added. This error will be corrected in the final document. None of the streams evaluated in the subbasin assessment and TMDL are Type "F" channels, thus should not be characterized as U-shaped. The reference will be added. The letter from IDFG states "**Historically**, the lower reaches were likely used as seasonal migration corridors connecting upstream populations to the Snake River." DEQ's interpretation of this correspondence is that currently and "historically" this reach (and the other reaches outlined in the letter) are not and were never spawning reaches.

migration corridors remains important."	
5) Page 85, Paragraph 1. "Sites a target of 28% fines. What is the reference for the 28%?"	This target is based on other TMDLs (DEQ 2001a, 2001b) as referenced in the "References Cited" section.
6) Page 88, Paragraph 2. "Last sentence refers to North Fork Castle Creek. Is the correct reference the main stem Castle Creek?"	The correct reference is the main stem Castle Creek.
7) Page 89, Figure 2.25. "Would be helpful to have the river mile or mile post indicated on the legend to help the reader see the spatial relationship between the sample sites."	River mile will be added to the legend.
8) Page 90, Paragraph 4. "Please include SAWQP in the acronym list"	SAWQP will be placed in the acronym list.
9) Page 93, Figure 2.28. "Just checking, is the Y-axis TSS or SSC?"	As indicated by the figure, the Y-axis is Total Suspended Solids.
10) Page 98, Paragraph 2. "Modify the last sentence to read: The influence of groundwater **inputs or losses to the groundwater table are** unknown."	The sentence will be modified to read: The influence of groundwater inputs and losses on stream flow is unknown.
11) Page 99, Paragraph 2. "Modify the third sentence to read: While sediment data are not available **downstream of the RCEW tollgate weir**, it is reasonable…."	The sentence will be modified accordingly.
12) Page 100, Paragraph 1. "Fifth sentence refers to "high residue". Please explain what this means."	A brief definition of "high residue" will be added to the text.
13) Page 102, Figure 2.35. "Is this data from RCEW? If not, why not use their data. RCEW may have only summarized data through 1996. But data are available to the present."	As indicated in the document, Figure 2.25 is generated using data collected by ERO Consulting. No RCEW data exists for the §303(d) listed segment of Reynolds Creek.
14) Page 122, Figures 2.47, 2.48. "Would be helpful if the symbols are consistent."	The symbols will be changed so that they are consistent in both figures.
15) Page 150, Paragraph 4. "Not sure what is meant by the "Owyhee drainage". Do you mean Owyhee Front drainages? Or streams that originate in the Owyhee Front and flow north to the Snake River? Modify second sentence to read: **Depending on land management practices, it may** take at least….."	Owyhee drainages will be changed to Mid Snake River/Succor Creek watershed drainages. The sentence will be modified to include "depending upon land management practices…"
16) Page 151, Paragraph 3. "Second sentence refers to a target of 80% stream bank stability. Refer to Appendix A in "General Technical Report RMRS-GTR-47, April 2000, Monitoring the	Numerous authors have determined that between 80% and 85%+ is an achievable bank stability target for naturally functioning streams. The Pahsimeroi TMDL (DEQ 2001) used 80% bank stability as the

Vegetation Resources in Riparian Areas, Alma H. Winward. USDA Forest Service Rocky Mountain Research Station". Bank stability will depend on stream type and substrate. With most low gradient streams capable of attaining 85% or better." 17) Page 169, Table 53. "Current solar load column. Is this from SSTEMP, also?" 18) " It would be helpful to have Figure 4-2 (page 4-4) from Rosgen's book. This is the figure that shows diagrams of the various channel types…" 19) "Include SSC and TDG (total dissolved gas) in the glossary." 20) "May want to include a discussion of the recent fires that occurred in Jump Creek drainage and SF Sinker Creek."	surrogate for 28% fine material in riffles. Since 28% is also the substrate target used in the Mid Snake/Succor Creek TMDL, it will remain consistent with the Pahsimeroi TMDL. Current solar load is determined using SSTEMP. The table will be changed accordingly. DEQ feels that the channel shapes for the streams of interest are suitably described in the document. TDG will be included in the glossary. Suspended sediment is already included in the glossary and a discussion of SSC occurs in the text. Comment noted.
Comments From: Faye Pfrimmer Mayor, City of Marsing Received via fax: February 28, 2003	**DEQ Response:**
Please consider no change in the permit levels for the City of Marsing wastewater treatment plant for the following reasons: 1) The wastewater treatment plant was designed to treat the sewage of approximately 1300 individual homes. The wastewater treatment plant currently serves the equivalent of 500 homes, more or less. Therefore the contribution of the wastewater treatment plant is well below the design capacity and may NEVER reach the capacity it was designed for. Also, the excess capacity allows for better treatment of the effluent, thereby impacting the watershed less than projected in the TMDL. 2) In the event the permit levels for the City of Marsing are altered in a way that would prohibit the historic effluent discharge into the Snake River, the next best alternative for the effluent disposal would be land application. Please consider the burden this would pose for the City of Marsing. The City of Marsing does not own property of the size and type that would be needed to take the effluent. The City of Marsing does not own the equipment or employ the staff to accomplish the land application Grant (free) money is not readily available to fund any change to the system. If the City of Marsing is	At this time, the TMDL does not require Marsing to meet the instream nutrient target. As stated in your comment, the Wastewater Treatment plant may never reach capacity in which case no changes would need to be made. The TMDL allows time for planning to meet the nutrient target by only requiring the city of Marsing to meet the target if the WWTP goes over design capacity. DEQ acknowledges the preliminary investigation that Marsing has done in examining the nutrient reduction options available to them.

forced to abandon the current system of discharge the money will be compelled from the residents of this community through a substantial increase in sewer fees The City of Marsing wastewater treatment plant operates safely and efficiently as it is. The contribution, any contribution, the wastewater treatment plant has to the water quality of the Snake River has to be infinitesimal compared to the other contributing sources outlined in the TMDL. The City of Marsing is a socially and economically disadvantaged community. Many, in fact, most of our residents are comprised of senior citizens, migrant laborers, farm workers and the working poor that live on a fixed or low income. These are good honest people who live in this town because it is affordable and they enjoy a good, quiet quality of life. When it is no longer affordable to live in Marsing, the folks will leave and Marsing will become a ghost town. An increase in sewer fees, any increase will mean a decrease of some other basic necessity. It would be a shame to have already disadvantaged families going without food to pay their SEWER bill. In summary, the cost to implement effluent disposal by land application would be absolutely prohibitive to the residents. The City of Marsing has conducted preliminary estimates of the cost to change to this type of effluent disposal and not only is the City faced with designing and constructing additional effluent storage, the City will have to bear the cost of engineering and construction to deliver the effluent for land application. The construction and engineering costs of the system coupled with the ongoing expense of transporting and spreading the effluent are just more than the residents of Marsing will be able to bear.	
Comments From: Harold Puri Mayor, City of Homedale Received via mail: February 28, 2003	**DEQ Response:**
1) "Homedale's current wastewater treatment facility operates well within the current requirement of DEQ. Historically the facility has operated safely and has experienced few problems. Should the proposed permit levels be initiated, the City's only alternative to our current system would be land application. Land application, which would be tremendously expensive as the alternative effluent disposal, would, by necessity, be passed onto city residents who can ill afford any increases in public services. Owyhee County,	This TMDL allows the Homedale Waste Water Treatment Plant to continue discharging at their current level. This TMDL allows time to plan for and obtain funds for nutrient removal by stating that the Homedale WWTP must meet the nutrient target of 0.07 if the plant is going to undergo expansion. The Homedale facility will have to experience considerable growth before design capacity is met.

including the City of Homedale, has one of the lowest per capita incomes in the state of Idaho. Our current population is 40% Hispanic, most of which rely on seasonal agricultural based employment and live, at best, with serious financial limitations. Senior citizens comprise another large number of our residents, they live on fixed incomes and would be faced with decreasing other basic necessities in order to pay their sewer bills. I believe Homedale's current wastewater treatment facility, has little, if any effect on the water quality of the Snake River. I would ask that you consider the tremendous impact of your proposed changes on all residents living in small rural communities in our State."	
Comments From: Robert Walker City Engineer, City of Homedale Received via fax: February 28, 2003	**DEQ Response:**
1) "As Engineer for the City I am hereby requesting that discharge levels for the City's wastewater treatment lagoon facility not be altered and I would ask that you consider the following: Capacity: Homedale's wastewater treatment lagoon facility was designed for a monthly maximum flow rate of 0.45 MGD. At the present time the annual average daily flow rate is 0.25 MGD and the maximum daily flow rate is 0.29 MGD. Therefore, the City of Homedale will have to experience considerable growth before the wastewater treatment lagoon facility reaches its design capacity. Economic Impact: As with all small rural communities the economic impact of the proposed discharge level proposed changes would be devastating Current Operation: Homedale's wastewater treatment facility currently operates safely, efficiently and well within current DEQ requirements.	This TMDL allows the Homedale Waste Water Treatment Plant to continue discharging at their current level. This TMDL allows time to plan for and obtain funds for nutrient removal by stating that the Homedale WWTP must meet the nutrient target of 0.07 if the plant is going to undergo expansion. The Homedale facility will have to experience considerable growth before design capacity is met which will give the city time to figure out how to finance any future changes.
Comments From: Craig Baker, Ranch Manager Sierra del Rio Received via fax: February 26, 2003	**DEQ Response:**
1) Sinker Creek should be designated as an intermittent stream. Even the historic name by which it is known indicates that it is naturally dewatered in some sections and then rises again in another area. On page 35 and page 105 the draft assessment says that the stream is dewatered below the diversion for Nahas Reservoir. In	The intermittent stream classification used in this TMDL is for those streams where perennial pools do not exist. Sinker Creek appears to have perennial pools throughout the summer in this reach. However, the stretch below the diversion for Nahas Reservoir is dewatered and does not have perennial pools. This stretch was not considered for

actuality, it is also frequently dewatered through a section of the old Tyson Ranch, which is currently called the Edwards Ranch. Twice in my tenure here I have seen it bone dry at the Nahas diversion in August and most every year it falls below 1 cfs for periods in the month of August.	the TMDL allocations. The section below the Edwards Ranch and above the Nahas diversion does not have bank stability problems and is not subject to riparian shade increases beyond those which would occur from the existing vegetation increasing in size. This will be documented as part of the implementation process.
2) "I believe that the temperature goals are unattainable by your definition on page 149. By this definition in the draft I believe the temperature listing should be dropped at least in the section between the Edwards Ranch and the Nahas Ranch. This section is basically inaccessible to all but the most dedicated hiker and some occasional wildlife. This area has been virtually unaffected by any influence other than nature for many, many years. If ever a place could be called pristine this would surely qualify. As such it has a very narrow stream channel and almost total shading in many areas. I feel that the effects of the narrow, very rocky canyon on ambient temperature has been overlooked. But probably the biggest unaddressed cause is the 30 or so beaver dams on this stream. As stated on page 105 they do act as sediment sinks which should help that situation but as for temperature goals, they work against us. By pooling the water, slowing it down and exposing to longer to the sunlight and hot air the temperature is raised."	Topographic shade as well as ground reflectivity was accounted for in the SSTEMP model. If additional information is gathered that suggests that other parts of Sinker Creek have natural factors that prevent target attainment, the temperature target will be adjusted accordingly.
3) "The fisheries question has been addressed by the letter from Jeff Dillon on page 241 and should be considered not suitable for spawning in the reaches of interest. It is also quite difficult to have fish habitat in a dry stream."	Comment noted.
Comments From: Paul Nettleton, Owner/Manager Joyce Livestock Company Received via fax: February 28, 2003	**DEQ Response:**
1) The conclusions of DEQ personnel about aquatic life beneficial uses not being fully supported may or may not be true since much of the data used to make this determination is more than six years old or has been 'extrapolated' from other areas. This could explain why DEQ has failed to take into account the devastation that has occurred from extensive beaver activity in the middle area of the 303(d) listed section. This beaver activity has destroyed a large majority of the woody vegetation in the past four years and caused extensive bank instability from lost root systems. Washouts have occurred when dams were abandoned because wood supplies were	A narrative analysis of the effects of beaver will be included in this TMDL. TMDLs include an analysis of both natural and human sources of pollutants. The actual effect of beavers will be further accounted for in the implementation plan in coordination with IDFG.

depleted. Few areas of this six mile section of stream between the Sinker 1 thermograph site and the sinker 3 site have been unaffected by beavers. While the document briefly mentions beaver ponds on page 105 and correctly attributes an increase in water temperatures, DEQ has certainly not given this activity the importance it deserves. This is especially true considering that no livestock grazing occurs in this middle section for 11 months out of the year whereas the upper area of the listed section which met water quality standards (at Sinker 1 thermal site) is grazed year-round. At the present time the only control on beavers is the fur market and whoever landowners can get to trap them. 2) DEQ should have reached the conclusion in this listed section that temperature standards and sedimentation/bank stability goals are unattainable unless beaver activity is controlled. The total listed reach of Sinker Creek is only a human-controlled conveyance for irrigation and has not been a natural stream ever since the construction of the dam more than 25 years ago. Flow rates are strictly controlled by releases from the dam. Therefore the erosion rates inventoried on page 270 are inaccurate and irrelevant because there are no naturally occurring high flows that would cause such erosion except the occasional infrequent desert cloudburst in the dry gullies below the dam. The only other possible erosion source is the washout of abandoned beaver dams.	Additional narrative on beavers will be added. DEQ inventories only actively eroding sections of the stream that would be affected by the high flows that occur presently. DEQ found that the banks are in relatively good condition as evidenced by the small reduction in bank erosion necessary to meet the requirements of the sediment TMDL (8%). There are areas of banks where there is slumping, sloughing, and these areas deliver sediment directly into the creek. There are many streams in Idaho that are human controlled and supply irrigation water. This characteristic does not relieve DEQ from preparing a TMDL for impaired streams and attempting to implement measures to achieve water quality standards.
Comments From: William H. Parker, Sportsman Bruneau, ID Received via fax: February 28, 2003	**DEQ Response:**
1) This TMDL lacks the scientific data to back up some of its conclusions. In particular, 303(d) listed streams are often listed without having adequate data to prove water quality impairment. 2) Page 27: The Montana State University reference does not exist. 3) The committee and personnel charged with the oversight of the Implementation Process need to have the scientific data specific to this area in regard to making changes that are necessary for the TMDL.	DEQ feels that adequate justification has been provided in the subbasin assessment to warrant §303(d) listing of the Snake River (C.J. Strike Dam to Castle Creek) for temperature and TDG, Jump Creek (Mule Creek to Snake) for sediment, and Succor Creek (Oregon line to Snake) for bacteria. DEQ will correct the reference. The implementation plan will be developed cooperatively by the affected stakeholders, the WAG, and the designated agencies (including DEQ). All of these entities will have access to the scientific data necessary the update the TMDL.

Comments From: Mark Frost, Chairman Bruneau River Soil Conservation District Received via fax: February 27, 2003	**DEQ Response:**
1) When describing the watershed characteristics, there is no mention of the effects that wildlife may have in respect to water quality issues. (i.e. elk, wild horses).	A narrative of possible effects of wildlife will be added in a Wildlife section.
2) Pg 138 Table 38, Add TDG to the glossary.	TDG will be added to the glossary.
3) Pg. 163, "Under nutrient allocations in table 48, it shows that the Snake River below CJ Strike has a phosphorus concentration of 0.07 and the Snake River at mile 449.3 has a concentration of 0.071. We do not feel that this segment should have a nutrient allocation for such a small difference of 0.001, since the degree of error for the spreadsheet that you used is 0.1 (100 times greater).	While this is a small amount, it represents a significant load in lbs/day. DEQ is conducting additional monitoring this summer to assess the pollutant load contributions from this section of the Snake River from CJ Strike Dam to Swan Falls. This additional data will be used to determine whether an allocation is warranted. Data will also be collected on drains and tributaries in the area to determine nutrient loading.
4) The TMDL needs more concrete data that meets scientific standards to be valid. Locations of samples, how they were taken, what time of day they were taken, were they representative samples. All these factors need to be considered.	The data used to develop the TMDL were collected and analyzed using sound and peer reviewed scientific principles. DEQ acknowledges that additional data would help increase the accuracy of the document. However, given the limited timeline to develop the TMDL, the best available data were used.
5) The District will support further evaluation of perennial stream segments and upland conditions in 2003. This will include development of a TMDL implementation plan on stream segments with perennial flow and documented problems.	DEQ acknowledges and appreciates the readiness of the District to participate in monitoring and implementation work.
6) DEQ should not try to set the practices required to meet the TMDL problems in the TMDL—that should be done in the implementation plan.	DEQ's intention is to summarize a range of potential implementation measures in the TMDL, but actual implementation measures will be determined as part of the conservation plan with each landowner.
Comments From: Robert Thomas, Thomas Brothers Oreana, Idaho Received via fax: February 28, 2003	**DEQ Response:**
1) Only a limited amount of data was used in the assessments. It is difficult to assess a watershed with such limited data, particularly when that time frame is one of the three dries since the end of the 19th century	DEQ agrees that assessments with limited data are difficult. However, DEQ is charged with writing TMDLs with the data that is available and tries to gather additional data whenever possible. The TMDL process is iterative, meaning that if new data is collected that shows different results, the TMDL can be adjusted accordingly.

2) The authors state that the climate in Boise is semi-arid and thus relatively similar to the watershed. Using the rainfall figure 1.1, the difference between Boise and Grandview is an astonishing 60%. There are differences in even which direction storm fronts approach in the Oreana area.	The authors acknowledge that there are differences between Grand View and Boise. DEQ only used Boise meteorological data when Grand View data was unavailable (i.e. percent sunshine). For the final TMDL, DEQ will verify whether there is Oreana or Reynolds Creek information available for those instances when Boise meteorological data was used.
3) Pg. 82, in reference to Castle Creek, regarding artesian (hot) water, will a water budget ever be completed and if not, what will the final determination be	DEQ has a staff member committed to determining a water budget from April-September 2003.
4) This TMDL seems incomplete	TMDLs are an iterative process and as more data is collected, that information will be incorporated into the TMDL and targets adjusted accordingly. The implementation plan which is typically completed 18 months after TMDL approval includes a timeline and milestones for meeting water quality goals.
Comments From: Elias Jaca Jaca Land and Livestock Co. Received via mail: February 28, 2003	**DEQ Response:**
1) Pg. 13, Table 2 "We question whether the fish are native or planted."	IDEQ has located sucker *sp.*, redside shiners, dace *sp.*, and adult and juvenile redband trout in Succor Creek above the Reservoir. IDFG does not stock fish species other than trout nor do they stock juvenile or young-of-the-year trout. Additionally, the trout stocked in the reservoir are sterile. Based on this information, the young trout located above the reservoir are most likely native.
2) Pg. 14, Table 2, "Where is the supportive data for this. We know there are few, if any, fish from the headwaters of Succor Creek to Granite Creek."	IDFG, BLM and DEQ generated the data used to populate this table. DEQ agrees that the fish population in Succor Creek from its headwaters to Granite Creek is sparse. However, fish were present.
3) Pg. 27-40, "DEQ needs identify upper and lower Succor Creek on their own merit separate from each other - not together."	Upper and Lower Succor Creek will be identified as separate segments by adding an additional figure into the document.
4) Pg. 41 The last paragraph, "from the third sentence should be documented with data. These are bold statements that can be disputed. Where are the facts to make these statements."	References will be added.
5) Pg. 115, "Says there are few major diversions on Upper Succor Creek. This is inaccurate. There are four major diversions with adjudicated water rights in 5 miles above the Succor Creek Reservoir."	The document will be changed to reflect the fact that there are four adjudicated diversions above Succor Creek Reservoir.

6) Pg. 116, Table 30, "The figures about the flows in Upper Succor Creek are not accurate. i.e 9.7 miles upstream from reservoir 5-20-02 19.6 is excessive. How was this measure this? And why are these reading taken mostly in June when the critical time for fisheries is much earlier in the year."	DEQ believes the flows shown in Table 30 are accurate. The flows were determined following the standard set-interval method using a calibrated Marsh-McBirney flow meter. The date the measurements are taken is based on two factors; 1) availability of field personnel, and 2) availability of flow. DEQ also believes June to be a critical period for fisheries due to increased temperature and continuation of spawning.
7) Pg. 117, How are you distinguishing between lower and upper Succor Creek in Figures 2.43, 2.44 and 2.45. It is impossible to know what, where or how the data was specifically collected. How can you say this is best available data, it appears to have been manufactured from somewhere else.	Additional text will be added below the "Succor Creek" header to further clarify Upper Succor Creek as – headwaters to Oregon Line, and Lower Succor Creek as – Oregon Line to Snake River. The majority of the data used in the subbasin assessment and TMDL were generated by those entities outlined in Appendix C. These data represent the best information available to DEQ when the subbasin assessment and TMDL was prepared.
8) Pg. 125, "Sediment does not flow straight to the river, it is deposited on point bars as it travels. Where is the hard data to prove streambank stability or instability?"	DEQ agrees that sediment is not transported directly to the river. The particle size distribution data shown in Table 32 indicate such. Appendix H shows the streambank erosion inventory data for the streams in which bank erosion driven sediment TMDLs are prepared (Table 46).
9) Pg. 129 Figure 2.53, "Where is the data before 6-6-95? More assumptions?"	As noted in Table 35 and the following text, no data are available prior to 6-6-95. The assumption that all temperatures prior to 6-6 (back to 3-1) are below the temperature criteria is used.
10) Pg. 133, Table 35 should be removed because it is irrelevant and there is very limited data.	Table 35 shows the percent exceedence values for the temperature data. This table is critical in determining whether the criteria are met.
11) Pg. 136 Last paragraph, first sentence, "Please define and document."	Further definition of the method to fill data gaps will appear as part of the TMDL implementation plan.
12) "This document has too much reference to lack of data and too many inaccuracies to make it credible"	The subbasin assessment and TMDL was developed with the best available physical, chemical and biological data. DEQ is legally compelled complete the Mid Snake River/Succor Creek TMDL by December 2002. Given the short time frame, DEQ collected as much additional data as possible to aid in development of the subbasin assessment and TMDL.
Comments From: Jerry Hoagland Wilson ID Received via fax: February 28, 2003	**DEQ Response:**
1) Page 46 Table 4. Define IRU as an acronym	IRU will be added to the acronym list.

2) Page 12 vegetation: Junipers are also an invasive species. Juniper encroachment causes both water quality and quantity problems. The BLM-ORMP plans to remove or burn at least 7500 acres per year or a maximum of 15,000 acres annually for the next 20 years simply to maintain control of the encroachment.	Additional narrative on juniper encroachment will be added.
3) Page 13 DEQ's recognition that redband trout have developed a tolerance for higher water temperatures found in the Owyhee desert is appreciated.	DEQ acknowledges that redband trout have a tolerance for higher water temperatures.
4) Page 13 The loss of riparian habitat that cools stream temperatures can also be attributed to natural causes such as fire or extreme high flow events	DEQ agrees that riparian habitat loss can be attributed to natural causes.
5) Page 14 Table 2. Succor Creek (headwaters to reservoir) Are the fish in the creek, the reservoir or both. This needs to be clarified.	Table 2 will be clarified to show that the listed species are present in the creek.
6) Page 20 and 64. Maps show Rabbit Creek and West Rabbit Creek between Reynolds and Sinker Creeks. Only the 303(d) listed Rabbit Creek should appear on the map.	All of the appropriate figures will be corrected so that only the §303(d) listed Rabbit Creek is shown.
7) Page 21. The highest elevation is more than 8000 feet not 6500 feet.	DEQ will correct the elevation error.
8) Page 22. The movement of groundwater and water on the south-side moves in a northwesterly direction to the river.	This error will be corrected.
9) Page 24 A 1997 aerial photograph interpretation showed that vegetation was 20% forest. This forest includes mostly russian olive and tamarisk both invasive species and listed as noxious weeds in Idaho.	This information will be added into the TMDL.
10) Page 27. De-watering effects-flow alteration is not a pollutant. Agricultural water diversion is as Idaho DEQ has described on page 50.	Comment noted.
11) Page 27 Toy Mountain is more than 8000 feet in elevation	A correction will be made to clarify at what elevation Castle creek begins.
12) Page 32 & 103 & 104 There is no "town of Reynolds." Reynolds or community of Reynolds is more appropriate.	The document will be changed to reflect the comment.
13) Page 33 & 101 Figure 1.11 and 2.34 Maps show only Salmon Creek drainage and Reynolds Creek from outlet weir northeast toward the Snake River. Maps should include entire watershed of Reynolds Creek.	The maps will be modified to show the entire Reynolds Creek drainage.

14) Page 35 Sinker Creek originates at over 8000 feet elevation	This correction will be made.
15) Page 41 History and Economics, "historic placer mining activities contributed large amounts of sediment to the creeks and eventually to the Snake River." There may have been some placer mining in the Jordan Creek drainage. Almost all the mining in this Lower Snake River/Succor Creek watershed was from tunneling. There was some gold dredging along the Snake River up river from the mouth of Squaw Creek.	This information will be added to the TMDL.
16) Page 41. " "The introduction of cattle resulted…..soil compaction.:" Where? "The change in plant composition resulted in a greater frequency of fires in the area.: No. Prior to the Taylor Grazing Act, large numbers of cattle and sheep grazed the rangelands eliminating any fuels to carry a fire. The traditional natural fire frequency was stopped. Junipers are very intolerant of heat and thrived in the areas now not burned by the natural fire frequency. Since cattle and sheep introduction, there was no frequency of fire. We are working with USDA Agricultural Research Service to research fire effects and to restore fire frequency as a natural control of juniper, landscape and to improve water quality and quantity.?	Additional narrative about the Taylor Grazing act and a clarification of fire frequency will be added.
17) Page 42 The Swan Falls dam was built to provide power for the Trade Dollar Mine. The extra power was distributed to Silver City and other mines and camps.	This information will be added to the TMDL.
18) Page 42 Land Ownership, approximately 17.2% is private land in Owyhee County. The rest is federal and state land. The land is not 98% publicly owned.	The land ownership numbers will be corrected.
19) Page 44. Table 3 Verify your 2000 population numbers. Explain what the Murphy division encompasses	Population numbers were obtained from city clerks and the US Census website. The Murphy Division refers to a census division. This table will be corrected.
20) Page 51. Temperature: The boiling pot narrative is specious. In Owyhee desert streams refuge exists as evidenced by the fish populations in these streams. The "pot" was probably heated from the bottom in order to get an even temperature for the mortality test. That is unnatural since stream pools have varying temperatures with the bottom being the coolest due to springs and subsurface flows.	Additional narrative will be added to both explain the study and more clearly explain that streams do have refuge areas, varying temperatures and different mechanisms of heating. The intent of the Table was to show the mechanism of thermally induced coldwater fish mortality. The time to death column will be removed for clarification.
21) Page 98 Re: instantaneous BURP data	DEQ will add additional text to the document

collected. The 1998 flows are not normal and were due to a major storm event. Usually the creek is entirely diverted except for seepage at the diversions or limited return flows from the fields above the highway.	indicating that these flow were likely due to a storm event. DEQ agrees that most of the water in the stream is diverted, as noted in the text directly above Table 20.
22) Page 99. The 1998 BURP notes indicate that 75% of the water is being diverted. That might be the case for that particular date, but generally, almost all of the water is diverted except during spring run-off.	This statement will be remove from the document.
23) Page 105 Sinker Creek. The effect of beavers on Sinker Creek was inadequately addressed. " There is a severe beaver problem a short distance above highway 78 and for some distance below the highway and again above the Nahas Ranch. BLM has recognized the damage done by the beaver in their stream surveys and recommended "the use of a D-8 cat with some creative or even uncreative stream channel work to get rid of the beaver dams". The beaver consume the desirable shading plants, muddy the waters which attract more solar heat and burrow into the stream banks causing more erosion. This TMDL needs to include a narrative analysis of the beaver problem in this area.	A narrative on the effects of beaver will be added.
24) Page 109. Sediment/PFC: A stream segment can only be satisfactory or unsatisfactory in BLM's categories. This stream may have been rated as unsatisfactory because it was at risk but possibly on an upward trend, meaning that it might eventually meet the satisfactory rating. A further explanation of PFC data analysis is necessary.	A sentence will be added regarding the fact that PFC conditions have an upward, downward and static trend associated with them. The statement that the majority of streams in these upper reaches were found to be in unsatisfactory condition is valid.
25) Page 111. The de-watered section is below the Nahas Reservoir	DEQ staff found no water below the road crossing just downstream of the diversion.
26) Page 116. Table 30, This chart shows a wide variation in flows that occur from year to year and even within a year. This is typical for all streams in Owyhee County.	Comment noted.
27) Page 117 Succor Creek Reservoir: Active withdrawal of irrigation water creates an unnatural stream below	The document will be changed to reflect this comment.
28) Page 134 Beneficial Uses: Please explain what substrate is.	Additional text will be added to the document describing what is meant by "substrate sediment".
29) Page 149 and 150 Temperature. "Best achievable temperature" is a reasonable target given the desert environment and extreme air temperatures in this basin	DEQ agrees that the use of "Best Achievable Temperature" is a reasonable approach for developing temperature TMDLs in this basin.

30) Page 166 Temperature Allocations: DEQ recognizes that the SSTEMP model provides a gross estimate of heat lost or gained. There are too many unknowns when determining effects of inputs.	DEQ agrees that SSTEMP provides a gross estimate of heat lost of gained. Appendix G outlines the input values for the model. Of the 28 input parameters, the default value is used twice. The model validation work in Appendix G shows that in fact, the model was quite reliable at calculating the actual stream temperature.
Comments From: Ted and Glenda Gammett Winston Gammett Will and Brett Gammett Jordan Valley OR Received via mail: March 3, 2003	**DEQ Response:**
1) This TMDL has a lack of supporting data, numerous assumptions and inaccurate or unsubstantiated statements involving Succor Creek. This TMDL lacks credibility.	Comment noted.
2) Succor Creek above the reservoir should be de-listed due to the lack of substantiating evidence to show any water quality problems.	The water temperature and sediment data outlined in the subbasin assessment show that both are in excess of the Idaho Water Quality Standards.
3) Succor Creek does not always have continuous stream flow in the upper reaches.	DEQ agrees that continuous stream flow data does not exist in the upper reaches. Due to cost constraints, it is unusual to have continuous data, even on large water bodies.
4) Lower Succor Creek studies should be site specific and should be separate from Upper Succor Creek studies.	Additional text and maps will be added to the document to clarify Upper Succor Creek data and Lower Succor Creek data.
5) The following examples substantiate concerns about the lack of data used in this TMDL: Page 115 "Below the reservoir, the stream flows continuously due to discharge from the reservoir.". During the drought year of 1992 there was not a continuous flow even below the reservoir.	DEQ will add additional text to the document to reflect that Succor Creek was dry below the reservoir in 1992. However, 1992 was the driest year on record in many areas of the state, and does not represent normal conditions.
6) Page 115. "there is not a significant amount of flow data for lower Succor Creek to accurately characterize the stream's seasonal flow fluctuation" What then, is the basis for stating that there is a typical flow pattern.	The DEQ statement "there is not a significant amount of flow data for lower Succor Creek, but enough exists to accurately characterize the stream's seasonal flow fluctuation" is based on our belief that enough data exists to develop a hydrograph for 4-00 to 4-01. This hydrograph clearly shows the effects of the irrigation season on the flow pattern.
7) Page 117, "regarding the Succor Creek Reservoir maintaining a 40-ft minimum pool throughout the year in all year" --The Succor District Improvement Company has had to drain the reservoir to work on the head gate and the Idaho Fish and Game has shocked the fish as they	DEQ acknowledges that a 40-foot minimum pool may not have been left when head gate maintenance was performed, and will add text to the document to reflect the comment. However, this maintenance is not part of the reservoirs normal operational procedure. In most years a 40-foot minimum pool

were draining the reservoir and transplanted them to other locations. We are not certain that a 40 ft. pool was left, it was not a very large pool of water remaining.	is maintained.
8) Page 117 and 120, No water column data collected for upper Succor Creek—Data was collected primarily below the Oregon Line.	As indicated in the document, this is correct. Water column data is of less utility when bank erosion is the primary source of sediment.
9) Page 120, No water column data was taken for Upper Succor Creek but visual surveys indicated it is good. All the data was taken from lower Succor Creek.	This is correct.
10) Page 123, "No numeric value on TSS conditions for Succor Creek…"	This is correct. The Idaho Water Quality Standard for sediment is narrative, meaning there is no numeric value with which to compare results.
11) Page 123, "There is not a numeric value against which TSS conditions in Succor Creek can be compared…" Again site specific conditions need to be assessed for accuracy.	See above comment.
12) Page 124, "due to the small data set, these relative percentages have a low level of statistical rigor". "best available data"	DEQ agrees that additional data would increase the statistical rigor and certainty of the information presented in Table 32. However, the presented information corresponds closely with the bank stability information presented in Appendix H (ie. low bank stability in areas where fine material is high). As such, additional data would likely confirm the information in Table 32.
13) Page 125, Re: Temperature "The period of record was dictated by accessibility to the sites (or lack thereof due to snow) and vandalism." How can criteria be determined if you did not have access to the sites?"	Tables 34 and 35 show that assumptions were made to extent the period of records such that the critical periods for cold water aquatic life and salmonid spawning are accounted for. Documenting and following these assumptions allows for the criteria to be used.
14) Page 126, "Additionally, above the reservoir, data were not available during the spawning period."	DEQ agrees that there were insufficient temperature data to assess salmonid spawning at the monitoring site directly above reservoir. This is reflected in Table 35. As such, a temperature TMDL for the segment extending from the end of Chipmunk Meadows to the head of the reservoir is not being performed at this time. This is reflected in Table 53.
15) Page 133, "However, again due to insufficient data, the entire critical period cannot be evaluated. Actual data…" Then **assumptions are made**..	This is correct. See response for comment # 13.
16) Page 134, In the first paragraph "Therefore, DEQ **assumes** that this segment of stream also exceeds the criteria. In the second paragraph "**Again data are not available** for the entire	Given that the remaining three segment of Upper Succor Creek exceed the salmonid spawning criteria, it is reasonable to assume that the segment between the end of Chipmunk Meadows and the

salmonid spawning critical period. **If it is assumed**…"	head of the reservoir also exceeds the criteria. However, DEQ acknowledges that the lack of any temperature measurements during the spawning season disallows a conclusive determination. As such, DEQ is not developing a temperature TMDL at this time, as shown in Table 53.
17) Page 136, The "DEQ acknowledges there are additional data that would be helpful to increase the accuracy of the analysis" How can a TMDL be created with so little accurate data?	DEQ is legally compelled to develop the Mid Snake River/Succor Creek TMDL by December 2002. DEQ disagrees that the data used to develop the TMDL are not accurate. However, DEQ does agree that additional data would increase the accuracy.
The following are comments on specifics of the TMDL:	
18) Page 41 "The introduction of cattle resulted in…" "Grazing has had long-term effects on stream hydrology and vegetation." What documentation do you show for these statements? They could be considered defamatory to the cattle industry.	References will be added for documentation.
19) Page 115, "there are relatively few major diversions" In reality there are four major diversions with adjudicated water rights on Upper Succor Creek above the reservoir.	The document will be changed to reflect the fact that there are four adjudicated diversions above Succor Creek Reservoir.
20) Page 142, Under the Temperature heading "…and a loss of riparian vegetation (shading)." What substantiation do you have to show for this statement?	DEQ has shown in the document (Page 167), and the WAG has agreed, that 55% riparian shading represents a preliminary estimate of the riparian potential for Upper Succor Creek. Current conditions range from 13-16% (Table 53). An increase in the surface area of a stream exposed to sunlight leads to an increase in water temperature. This information substantiates that "a loss of riparian vegetation (shading)" increases water temperature.
21) Page 153, In the last sentence "Lack of access to private property prevented DEQ from monitoring throughout a subwatershed in some instances." If the DEQ did not ask private property owners if they could have permission to monitor on private land then access was neither approved or denied.	The document will be revised to reflect the comment.
Comments From: Brenda Richards Reynolds Creek Received via mail: March 3, 2003	**DEQ Response:**
1) Overall, throughout this document there are references to "lack of data" and "assumptions", which weakens the credibility of TMDL	Comment noted.

determinations and makes one question the credibility of the data used in making determinations.	
2) The TMDL should include more local weather data such as that available from the Reynolds Creek Agricultural Research Station.	Where possible, local climate and weather data were used to populate the SSTEMP model. This includes data from the Reynolds Creek Agricultural Research Station and the Sheaville, Oregon weather station. Boise Climate data was used in instances where Owyhee County specific data were not available.
3) Page 13, Refers to redband trout in the tributaries and the question arises as to whether or not redband trout is a proven native species to these waters or if they were a planted species by IDFG for fishing enjoyment. History of this species in this area needs to be further researched including asking some of the landowners if they have observed fish or known of streams being planted since they have been on the ground for over thirty years.	The Federal Clean Water Act and the Idaho Water Quality Standards require DEQ to protect *existing uses* as well as those used designated in the standards. As such, if fish were planted by IDFG and are naturally flourishing, DEQ is required to protect the resource. The natural and historic presence of redband trout in the watershed is well documented in the scientific literature.
4) Page 20 Figure 1.6, chart at the top of this table is illegible. Needs clarification or to be omitted if it cannot be read.	The table will be omitted from the figure.
5) Page 14 Table 2, In the reference at the back of the TMDL, there is documentation of correspondence between IDFG and DEQ. Would be more valuable if three was a history of data and how and when it was collected.	A footnote will be added to Table 2 indicating the method(s) by which the data were collected. In most instances, the data were collected using a backpack electrofisher.
6) Page 27-40 Subwatershed Characteristics—In this TMDL, DEQ has maps of each subwatershed except for Upper Succor Creek and Lower Succor Creek. These sections should be mapped and treated separately since the uses and terrain varies between the two.	Upper and Lower Succor Creek will be identified as separate segments by adding an additional figure into the document.
7) Page 41. History and Economics—"Grazing has had long-term effects on stream hydrology and vegetation" and "The introduction of cattle resulted in a decrease of native perennial grasses and an increase in soil compaction because of trampling by concentrated numbers of livestock." Where is the validity of these statements? There have been other anthropogenic sources that may have been contributing factors. Must have reference for credability.	References will be added.
8) Page 44 "5th paragraph, 1st sentence states "The Owyhee Natural Resources Committee formed in 2001 to address environmental issues facing watersheds in the Owyhee County area" This statement is incorrect. I am a member of the	These errors will be corrected in the final version using information provided by the Owyhee Natural Resources Committee.

Owyhee Natural Resources Committee and have been a member since 1998 and know that this committee was in place before that. Please check with Jim Desmond at Owyhee County for an accurate date.	
9) Page 44, "5th paragraph 2nd sentence states " "Another group, the Owyhee Initiative, is made up of a diverse membership of ranchers, environmentalists, and growers who are working towards a management plan for the proposed Owyhee wilderness area."" I am a member of the Owyhee Initiative work group and as a member of this group feel this statement is presumptuous and should be left out if this is all the explanation that will be given. The Owyhee Initiative is far more than ranchers, environmentalists and growers. There is a far more diverse representation that this. It is also doing much more than just discussing a management plan for the "proposed Owyhee wilderness area". It does the group much injustice to give reference as limited as this one sentence "Water quality issues are pertinent to streams that are within boundaries of the proposed wilderness area." There is no "formal" proposed wilderness area as of yet tied to this initiative and your sentence leads the reader to believe a proposed wilderness has been reached by this group. Several different interests involved in the Initiative have brought their ideas for proposals forward, but none has come forward from the entire Owyhee Initiative work group. Statements in the TMDL should not be misleading.	See above response.
10) Page 50 1st paragraph below Table 6, last sentence in the paragraph reads "Because of these practical limitations, TMDLs will not be developed to address habitat modification or flow alteration." In the tables in the back of the document there is an estimated increase requirement in shading along the riparian areas of 41-52%. This is significant habitat modification and may not even be a feasible achievement for the climate, soil type, etc.	DEQ does not consider the necessary increase in riparian shading a habitat modification as defined by the Idaho Water Quality Standards. However, DEQ agrees that the shading increases shown in Table 53 may not be achievable due to climate, soil type, etc. The achievable amount will be further determined during development of the TMDL implementation plan.
11) Page 51 3rd paragraph, 1st sentence. Change steam to stream	This typo will be corrected in the final version.
12) Page 51 Table 7, Modes of thermally induced coldwater fish mortality. This test is questionable in its application to natural stream temperature. This test is conducted in a lab by thermally inducing temperature increases much like boiling water in a pot. Natural streams do not increase their temperature in this same way. If Table 7 is included in the TMDL there needs to be more	Additional narrative regarding study methods will be added and Table 7 modified.

reference and description as to how this experiment was conducted.	
13) Page 65. Figure 2.4 July 14, 2002: Fish kill on the Snake River at Walters Ferry. This picture should be omitted from the document. Sentences 6 and 7 in the first paragraph on this page give adequate information regarding the fish. The picture is not essential in making the point and furthermore it could create a bias and/or negative impression. It is recommended to include sentences 6 and 7 but remove the picture.	Figure 2.4 serves as documentation of the fish kill and beneficial use impairment due to elevated temperature.
14) Page 99 1st paragraph after Table 20, second sentence reference to Brandau 2002. The reference to historical events that have affected the stream is good. It would be beneficial to have this kind of reference on Succor Creek.	Comment noted.
15) Page 117 Under Bacteria (E. coli), The last sentence states "There are no data available for upper Succor Creek" Note: no data available.	Comment noted. Upper Succor Creek is not 303(d) listed for bacteria and no data were available. As such, bacteria were not evaluated.
16) Page 120, Under Sediment, fifth sentence states, "There are no water column sediment data available from upper Succor Creek." Note no data available	Comment noted.
17) Page 124 & 125, In regards to Substrate Particle Size Distribution it should be noted that in these streams much of the substrate particles deposit on the numerous bars located within the stream before it travels very far downstream. Also there is no hard data to support this data assessment method.	The assessment method is documented in the text on page 124 and in the 'References Cites' section as Wolman (1954). The Wolman (1954) pebble count procedure is a well know and often used (by many states) method of determining particle size distribution. The method calls for particle sizes to be measured in riffles, where the effects of deposition caused point bars are minimized.
18) Page 129, Temperatures are assumed before 6-6-95 with no data.	No *specific* temperatures were assumed before 6-6-95. DEQ assumed that in general, all water temperatures are below the criterion.
19) Page 132 1st paragraph, last two lines, "Hence assumptions were made to accommodate for this lack of data. These assumptions are described below." Note the assumptions made and the lack of data.	Comment noted.
20) Page 134 1st paragraph, first sentence, "data not available directly above the reservoir during the critical period to assess salmonid spawning." Note data not available	Comment noted.
21) Page 136 1st paragraph, line three, "However DEQ acknowledges there are additional data that would be helpful. Additional data should be collected to determine accuracy. It is questionable	The model validation work in Appendix G shows that in fact, the model was quite reliable at calculating the actual stream temperature. DEQ feels that enough data were collected to develop the

with this statement as to whether enough data was gathered to plug into the models used for temperature. In the paragraph below Table 37 it is stated that efforts will be made to fill those data gaps. It could be questionable as to whether enough data was gathered to validate the TMDL. Furthermore, it could be questioned that without enough data, how can recommendations for the TMDL Implementation plan take place without collecting more information?	TMDL, but acknowledges that additional data would improve the accuracy of the allocations. It terms of TMDL implementation, the ensuing plan will take an adaptive management approach. This means that progress toward meeting the TMDL goals will be tracked as control measures are implemented. As such, data gaps do not preclude moving forward with implementation.
22) Page 142 Under *Temperature,* the third sentence: "The anthropogenic factors include agricultural return water, agricultural withdrawals, dams and a loss of riparian vegetation (shading)." Need reference documentation to say that there is a loss of riparian vegetation for credibility of this statement.	An increase in the surface area of a stream exposed to sunlight leads to an increase in water temperature. This information substantiates that "a loss of riparian vegetation (shading)" increases water temperature.
23) Page 149 Under Temperature, the first sentence, "Temperature targets are established on a stream-by-stream bases and are based upon the lowest possible temperature that can be expected given practical stream shading, width/depth conditions and monitored atmospheric conditions." I agree stream temperature targets should be established on a stream-by-stream basis and all aspects of that individual stream should be taken into consideration."	DEQ acknowledges your support of individual stream temperature targets.
24) Page 153 Under *Monitoring Points*, "There would be a question as to whether sufficient data was collected at enough monitoring points on Upper Succor Creek."	The subbasin assessment and TMDL was developed with the best available physical, chemical and biological data. DEQ is legally compelled to complete the Mid Snake River/Succor Creek TMDL by December 2002. Given the short time frame, DEQ collected as much additional data as possible to aid in development of the subbasin assessment and TMDL.
25) Page 169—Table 53, "in regards to the percentage increases required in shading. Are these numbers feasible and is it realistic to expect that they can be achieved?"	The "Estimated System Potential Shade" column in Table 53 shows preliminary estimates of the riparian potential for Sinker Creek and Succor Creek. These system potentials will serve as the starting points for best management practice implementation and may be adjusted appropriately as implementation continues.
Comments From: Mark Filipinni Environmental Protection Agency, Office of Water, Watershed Restoration Unit Received via fax: February 28, 2003	**DEQ Response:**
<u>Executive Summary</u> 1) Several of the landmarks referenced and	Figure 1 will be changed accordingly to show these

discussed in the document are not shown on any of the maps presented making review difficult. A map showing CJ Strike dam, Swan Falls, Homedale, and Marsing should be included.	landmarks.
2) Table C indicates that a bacteria TMDL was developed for Jump Creek. This appears to be an error.	This is an error and will be corrected in the final document.
3) The final document or cover letter should discuss for the record the level of public participation including the dates of the public comment period and the dates and locations of public meetings.	The final TMDL will document the exemplary level of effort by Mid Snake River/Succor Creek WAG as well as the public comment information.
Chapter 2	
4) The TMDL must present the designated uses for each water body (Table 5) and the specific relevant water quality criteria that apply to each use. Table 6 does not indicate to which use designation each of the criteria apply. Further, for designated uses with differing criteria, such as temperature for Cold Water Biota and Salmonid Spawning, the separate criteria must be specified. Table 6 should be revised accordingly. The specific IDAPA section defining each use designation and each criteria should also be presented or referenced in the document.	Table 6 will be adjusted accordingly.
5) Since some of the use designations for several waterbodies have been revised based on the SBA, a revision of Table 5 presenting the new use designations should be provided. This information could also be presented on Table 38, if desired.	DEQ will clarify this statement. The intent of the correspondence between DEQ and IDFG is to show that while it may be appropriate for an entire stream (headwaters to mouth) to be designated for salmonid spawning, spawning does not actually exist throughout the entire stream. Very low gradient response reaches, such as those described in Appendix F may never have been spawning reaches. They do, however, remain important migration corridors. As such, DEQ does not intend to remove the salmonid spawning designation.
6) Section 2.3, Intermittent Streams. EPA will provide comments on the proposed delistings for the intermittent streams within the next several months under separate correspondence. As this is a recommended delisting action, this should not affect the TMDLs presented.	Comment noted.
7) The proposed delistings for the Snake River, Reynolds, south fork Castle, and Squaw creeks appear supportable based on staff review. Delistings are subject to final agency	Comment noted.

determination under a separate administrative process.	
8) Section 2.3, Castle Creek. The proposed delisting for temperature on the mainstem of Castle Creek is not supported and cannot be approved. We agree that additional data is needed to determine stream conditions and sources. Only after such data is obtained can a determination regarding delisting be made.	The proposed de-listing was a typographical error. DEQ has delayed development of this TMDL until more temperature data is gathered in 2003.
9) Section 2.4, Data Gaps. Table 37 presents data gaps identified during development of the SBA. Jump, Reynolds, Sinker, and Squaw creeks have range and grazing uses within the watersheds. Based on this land use, is there a reason bacteria was not considered a data gap for these streams as it was for Succor Creek? This should be explained in the document. Was temperature considered as a data gap for the mainstem Castle Creek and Jump Creek?	Unless a conclusive amount of data existed (as in the case of sediment for Jump Creek and bacteria for Lower Succor Creek), DEQ only evaluated the §303(d) listed pollutants. As such, additional pollutants were not considered as data gaps in the assessment.
Chapter 5	
10) Sections 5.1 to 5.4 present parameter-specific information regarding water quality targets, loading capacity, existing pollutant loads, and load allocations. However, bacteria is missing from the discussions in each of these sections. For clarity, either bacteria should be included in these sections, or an explanation provided as to why it is discussed separately and where. (see also Bacteria Allocation below)	A discussion of bacteria as it relates to section 5.1-5.4 will be added to the document.
11) For clarity, the use of surrogates should be discussed in Section 5.1. It should also be specified for which waterbodies they will be used. Though discussed in subsequent sections, a statement regarding each of the following under 'Target Selection' would be helpful:	Additional text regarding the use of surrogates will be added to section 5.1.
12) Temperature is the pollutant, but effective shade is used as the surrogate for meeting the temperature criteria.	Similar text will be added to the document.
13) Percent stream bank stability is used as the surrogate for sediment in upper Succor, Castle, and Sinker creeks.	Similar text will be added to the document.
14) Total phosphorous is used as the surrogate and indicator for the narrative nutrient criteria.	Similar text will be added to the document.
15) Section 5.4, Load Allocations. Although critical period is discussed in this section and the critical periods for each of the waterbodies is presented in Table 43, the text should include a	Text stating that critical conditions were considered in development of the TMDLs will be added to the document. Additionally, Table 43 will be modified to explicitly show the time of year when TMDLs

statement that critical conditions were considered in development of the TMDLs. The document must also state explicitly for each listed water body and parameter whether the TMDL will apply year-around or only during a specific time of year, and why. Sections 5.1 or 5.2 may be a good place for this discussion including the basis for selection of the applicable time period. Table 43 could also be revised to add "Time of Year Applicable" to a column.	are applicable.
16) The seasonal loading of phosphorous is discussed in Section 5.2. It appears DEQ would apply the nutrient TMDL only from May to September. However, in other watersheds in the northwest TMDLs for nutrients have been applied year around. Nutrient loads during winter can deposit in sediments and later be released during the critical season, creating a significant source. Unless this is not believed to occur in the Snake, applying the nutrient TMDL year round should be considered.	The SR-HC TMDL established this target based on a rigorous analysis of when algal growth impaired beneficial uses. More than 70% of organic loading comes from nutrient loading during that time frame. The Mid Snake River/Succor Creek watershed is similar. Nutrients released during the critical season should be entrained by BMPs. Since all tributaries and drains need to meet the 0.07 mg/L target, the specific BMPs will need to account for build-up of nutrients outside of the critical period that might be released during the critical period. Further, nuisance aquatic growths are primarily seen during the critical season. Finally, many of the BMPs implemented will likely be effective outside of the critical period, and will reduce nutrient concentrations. If the Snake River is not meeting the milestones during the implementation period then the critical period will be reevaluated.
<u>Sediment, Bacteria, Nutrient, and Temperature Allocations</u>	
17) The last four sections of Chapter 5 present the official TMDL for each water body. Each section should summarize and present all required elements of the TMDL. Each section should show the relationship between the loading capacity and the load and wasteload allocations for each water body.	Comment noted. Additional discussion below.
18) For example, in each of these sections the loading capacity for each parameter and water body must be explicitly identified in the text in quantitative or surrogate terms. [i.e. 'The loading capacity for Succor Creek is ___.'] The text in these sections should discuss the derivation of the loading capacity (or reference where in the document it is derived) and summarize its relationship to the targets. Loading capacities should also be presented in the allocation tables when appropriate. The temperature TMDL does a good job of explaining the loading capacity, where it is derived in the appendices, and presents and identifies the values in Table 53. This approach would work well for the other sections.	Comment noted. Additional discussion below.

Sediment Allocations	
19) Per the discussion above, the derivation of the loading capacity and its relationship to the targets and load allocations must be provided. The derivation of the sediment load allocations for Succor and Jump creeks from the targets of 16 mg/l and 65 mg/l respectively, to tons/day (or vice versa) is unclear. If there is a formula for the mass balances in figures 5.1 and 5.2, the formula or worksheets should be presented. The loading capacity for each water body should also be identified in tables 44 and 45.	The methods by which the sediment load capacities were developed are located in the Section 5.2. However, additional text will be added to the document to clarify the capacities in terms of tons/day. The loading capacities will also be integrated into Tables 44 and 45. The mixing equation formula on which the mass balanced are based will be added to the document.
20) It is assumed that the derivation of the loading capacity for Sinker, upper Succor, and Castle creek is presented in Appendix H as the 'Target Erosion Rate'. However, this is not specifically identified in the appendix. This identification should also be made in the text and Table 46.	The loading capacity values will be better defined in Table 46.
21) An explicit statement that no point sources are present within the watershed must be included in the text. Also state that no future growth has been accounted for in the load allocations. Therefore, all future point sources would receive a zero waste load allocation. Since there are no point sources in the watershed, reasonable assurances are not necessary. The times of year the TMDL will be applicable should also be stated.	This information will be added to the "sediment allocation" portion of the document. The time of year the sediment TMDLs will be applicable will appear in a revised Table 43.
Bacteria Allocations	
22) As bacteria was excluded from the discussions of targets, loading capacities, existing loads, load allocations, seasonal variations, critical conditions, etc. earlier in this chapter, each of these elements must be discussed in this section. Explicit statements as to the loading capacity and targets must be presented. It is assumed that both the loading capacity and target are set at the water quality criteria. It should be explained that the loading capacity was chosen to be the criteria concentration (in colonies/ml) because calculation of a load in terms of total colonies per river segment per day (in the classic definition of TMDL) was not practical given the difficulty in translating such a load into meaningful terms and the limits of available data.	Discussions of target selection, loading capacity determination, etc. will be added to the document where appropriate.
23) An explicit statement that no point sources are present within the watershed must be included in the text. Also state that no future growth has been accounted for in the load allocations. Therefore, all future point sources would receive a zero waste load allocation. Since there are no point sources in	This information will be added to the "bacteria allocation" portion of the document. The time of year the bacteria TMDLs will be applicable will appear in a revised Table 43.

the watershed, reasonable assurances are not necessary. The times of year the TMDL will be applicable should also be stated.	
Nutrient Allocations	
24) The fifth paragraph on page 164 which discusses the current wasteloads and wasteload allocations from the two point sources is unclear. The current discharges for the WWTPs (2 kg/day and 3 kg/day) are below their permitted limits (4 kg/day and 5 kg/day) which is their design capacity. The wasteload allocations assigned to them are these permitted limits. Any expansion beyond their permitted limits (design capacity) would require the WWTPs to find other means of meeting the limits. If this is the situation, it is unclear from the current reading of the paragraph.	This paragraph will be rewritten.
25) Also in this paragraph include a statement that any future point sources would receive a wasteload allocation of zero. State that a discussion regarding reasonable assurances is provided in Chapter 4.	This correction will be made.
26) The next paragraph regarding implementation should include a more explicit statement regarding effluent trading. We would suggest: 'The wasteload allocations and load allocations presented in this TMDL may be adjusted under a state-approved effluent trading program as long as the loading capacity is not exceeded.'	This correction will be made.
27) How the loads presented in Table 49 were calculated and how they relate to the loads presented in Table 51 is unclear. Their sum does not equal any of the values in the table. The derivation of the values in Table 51 should be explained.	2000/2001 year data was used for Jump and Succor Creek data instead of using '95/00 flows. This error was made because DEQ had recent data available. The table will be corrected.
28) Table 51 is also not presented correctly. Table 51 does not identify the wasteload allocations for the WWTPs as such, they are listed under the load allocations. The total sum of the load and wasteload allocations equaling a loading capacity is also not shown.	The tables will be corrected.
29) State that seasonal variations and critical conditions were considered in development of this TMDL and specify the times of year the TMDL will be applicable.	This statement will be added.
Temperature Allocations	
30) The TMDL in this section is well presented and includes the specific elements required for	Comment noted.

approval including the derivation of the loading capacity, the relation to the surrogates, and the loading capacity and load allocations are presented in Table 53.	
31) An explicit statement that no point sources are present within the watershed must be included in the text. Also state that no future growth has been accounted for in the load allocations. Therefore, all future point sources would receive a zero wasteload allocation. Since there are no point sources in the watershed, reasonable assurances are not necessary. The times of year the TMDL will be applicable should also be stated here.	This information will be added to the "temperature allocation" portion of the document. The time of year the temperature TMDLs will be applicable will appear in a revised Table 43.
Comments From: John Cossel Marsing ID Received via fax: February 28, 2003	**DEQ Response:**
1) DEQ has insufficient information to determine a TMDL for the upper reach and related segments of Succor Creek. Upper and Lower Succor Creeks need to be separated and treated differently because listings are different.	The subbasin assessment and TMDL were developed with the best available physical, chemical and biological data. DEQ is legally compelled to complete the Mid Snake River/Succor Creek TMDL by December 2002. Given the short time frame, DEQ collected as much additional data as possible to aid in development of the subbasin assessment and TMDL. An additional map showing Lower Succor Creek will be added to the document.
2) Pages 27-40 Subwatershed Characteristics, In this section DEQ has maps of all of the subwatersheds except for lower Succor Creek. Lower Succor Creek should be differentiated from upper Succor Creek. These need to be treated as separate subwatersheds.	An additional map delineating Lower Succor Creek from Upper Succor Creek will be added to the document.
3) Page 209, The DEQ statement" As per DEQ WBAG II guidance (Grafe et al. 2002), the Mid Snake/Succor Creek subbasin assessment uses the site-specific spawning period for redband trout. "The basin-specific spawning period is March 1 through June 15." But we note that DEQ does not have site-specific data pertaining to Upper Succor Creek. If site specific data were used pertaining to spawning periods, and those periods occurred at an earlier date than the basin specific periods, as could easily happen in this semi-arid climate characterized as hot and dry in the summer and cold and dry in the winter perhaps it would not be listed for temperature. Fish here under existing conditions….."	The temperature data displayed on pages 127-131 are in fact basin/site specific (to the Mid Snake/Succor Creek basin). However, DEQ agrees that in most cases data were not available for the extent of the spawning period. To account for that data gap, DEQ assumed that all temperatures prior to the date when data became available were BELOW the criteria. Using this assumption, greater than 10% of the data still exceeded the spawning daily average criterion (as shown in Table 35). Hence, the stream would indeed be listed for temperature.
4) "I am in complete agreement with DEQ statement 'where viable, steps should be taken to fill the data gaps.' Table 37 page 136 Data Gaps	Comment noted.

Identified prepared by TMDL authors acknowledges areas that need to be addressed."	
a. Pg. 116, Flow data available for upper Succor Creek is limited	Comment noted.
b. Pg. 117, Monitoring data consists only of instantaneous temperature data used to populate SSTEMP used to develop the temperature TMDL	Comment noted.
c. Pg. 117, pertaining to bacteria-there are no data available for upper Succor Creek	Comment noted.
d. Pg. 120 there are no water column sediment data available from upper Succor Creek	Comment noted.
e. Pg. 123 There is not a numeric value against which TSS conditions in Succor Creek can be compared – site specific conditions must be assessed to determine an appropriate sediment target.	Comment noted.
f. Pg. 123, reasonable assumption that if 15 mg/L TSS was not causing impairment of aquatic life in Boise River, 16 mg/L TSS will support aquatic life beneficial uses in lower Succor. Why is that same assumption not being applied to upper Succor?	The same assumption is in fact being applied to Upper Succor Creek, but water column data do not exist for Upper Succor Creek. This is noted in the "Data Gaps" portion of the document. Additionally, As opposed to Lower Succor Creek, salmonid spawning is a beneficial use in Upper Succor Creek (see appendix F). Due to the importance of stream bottom material (substrate) for salmonid spawning, particle size distribution is also assessed in Upper Succor Creek. It is this component that is impairing the spawning beneficial use.
g. Pg. 124, re: Wolman Pebble Count—due to small set of data these have low level of statistical rigor, however until additional data can be collected they represent best available data	Comment noted.
h. Pg. 125, There is no hard data to support the statement "Data Assessment Methods section describe linkage etc.	Comment noted.
i. Pg. 125, temperature—period of record was dictated by accessibility to sites and vandalism twice	Comment noted.
j. Pg. 126, Data were not available during spawning period	Comment noted.
k. Pg. 132, Temperature data were not available during spawning period	Comment noted.
l. Pg. 133, due to insufficient data the entire critical period cannot be evaluated	Comment noted.
m. Pg. 133, Data are not available for period between 8/22 and 9/21—it is assumed…	Comment noted.
n. Pg. 133, however, again due to insufficient data	Comment noted.
o. Pg. 133, actual data are only available from 6/19 thru 7/15…..it is assumed	Comment noted.
p. Pg. 133, difficult to determine due to lack of data	Comment noted.

q. Pg. 134, data were not available directly above the reservoir during critical period	Comment noted.
r. Pg. 134, logger was vandalized...therefore DEQ assumes	Comment noted.
s. Pg. 134, timing of-criterion- is difficult to determine due to limited data	Comment noted.
<u>Status of Beneficial Uses</u> 5) If data were broken out into two stream reaches, Upper and Lower Succor Creek and the lack of data were incorporated into this portion the status of beneficial uses for Upper Succor Creek would look like this:	
a. E. coli-there are no data available for Upper Succor creek pertaining to bacteria: Pg 117	Bacteria conditions were not assessed for Upper Succor Creek.
b. Sediment—states that "data indicate that excess substrate sediment is impairing	Comment noted.
c. there is no water column sediment data available from Upper Succor Creek.	Comment noted.
d. there is not a numeric conditions against which TSS conditions in Succor Creek can be compared, site specific condition must be assessed to determine an appropriate sediment target, pg. 123	Comment noted.
e. if it is a reasonable assumption that "if 15 mg/L TSS was not causing impairment of aquatic life beneficial uses in Lower Succor" why is that same assumption not being applied to Upper Succor, pg. 123	Upper Succor Creek, but water column data do not exist for Upper Succor Creek. This is noted in the "Data Gaps" portion of the document. Additionally, As opposed to Lower Succor Creek, salmonid spawning is a beneficial use in Upper Succor Creek (see appendix F). Due to the importance of stream bottom material (substrate) for salmonid spawning, particle size distribution is also assessed in Upper Succor Creek. It is this component that is impairing the spawning beneficial use.
f. re: Wolman Pebble count, due to small set of data these have low level of statistical rigor, however until additional data can be collected they represent the best available data, pg. 124	Comment noted.
g. in reviewing Table 32, Chad Gibson pointed out…fax becomes unreadable.	Comment noted.
6) "The only concrete piece of data that DEQ present pertaining to sediment is a photo on page 121 which is literally noted on page 120 as "Figure 2.46 shows a dated photograph of the water column and substrate near Berg Mine. Note the good water clarity and good distribution of substrate material."	Comment noted.
7) Temperature-pertaining to both cold water	

aquatic life and salmonid spawning: a. flow data available for Upper Succor Creek is limited pg 116 b. monitoring data consists only of instantaneous temperature data used to populate SSTEMP used to develop the temperature TMDL pg 117 c. period of record was dictated by accessibility, pg. 125 d. period of record was dictated by vandalism e. data were not available during spawning period, pg. 126 f. temperature data were not available for full extent of critical period, pg. 132 g. assumptions were made to accommodate lack of data, pg. 132 h. due to insufficient data the entire critical period cannot be evaluated, pg. 133 i. data are not available for period between.. it is assumed, pg. 133 j. however, again due to insufficient data, pg. 133 k. ambient air temperature data seems to have been collected from.	 Comment noted. Comment noted. Comment noted. Comment noted. Comment noted. Comment noted. Comment noted. Comment noted. Comment noted. Comment noted. Comment noted.
8) The above statements made by DEQ in this draft TMDL pertaining to Upper Succor Creek exhibit the need to expand on the DEQ statement (pg. 136) "where viable, steps should be taken to fill the data gaps."	DEQ agrees that the aforementioned statements exhibit the need to fill data gaps. The process by which this will happen will be further defined in the TMDL implementation plan.
9) Perhaps in the first phase of the next step, implementation, we should emphasize data collection first, a uniform consistent monitoring plan and schedule second, all prior to implementing costly, expensive projects that may or may not be effective.	DEQ feels that the TMDL shows a necessity for some level of best management practice implementation. However, DEQ agrees that additional data collection following a consistent monitoring plan should be placed as a task item in the implementation plan.
10) The meeting on December 23, 2002 between the landowners in the Succor Creek watershed and DEQ was very beneficial. Landowners have shown a willingness to work with DEQ. Several areas of contention were discussed and solutions offered. With resolution of the trespass/access issue DEQ will be able to establish a more complete and accurate database for this segment of the TMDL document, if they so choose. I hope that we have all learned that by contacting and including the landowners from the beginning there is a wealth of information that can be accessed, sometimes through entities that DEQ is unaware of (ARS, onsite weather/gauging stations, IDWR flow data, etc).	DEQ agrees that the December 23, 2002 between the landowners in the Succor Creek watershed and DEQ was beneficial and productive. DEQ appreciated very much the effort made by the landowners to bring forth concerns with the draft document. Additionally, in the near future, DEQ will be making efforts to fill the temperature data gaps on Upper Succor Creek. Landowners will be given every opportunity to participate in this process.

Comments From: John Romero Murphy ID Received via fax: February 28, 2003	**DEQ Response:**
1) "Throughout this document there is reference to "lack of data" and due to this lack of data the words "assumptions were made" are used repeatedly. Basing determinations on lack of data or assumptions lacks credibility." There are specific notations of places where this occurs in the following comments.	The subbasin assessment and TMDL were developed with the best available physical, chemical and biological data. DEQ is legally compelled to complete the Mid Snake River/Succor Creek TMDL by December 2002. Given the short time frame, DEQ collected as much additional data as possible to aid in development of the subbasin assessment and TMDL.
2) "Natural resource users have a long history of dealing with both state and federal government agencies. Sometimes these experiences are forthright, however many times they are unpleasant and burdensome. Lives have suffered from the almost continuous demand of time and money required to meet the increasing requirements of the business of "new" environmentalism. The last few years, resource users have been confronted with endangered species listing petitions, EPA imposed hazardous materials cleanup, federally mandated grazing restrictions, private property rights decisions and 303(d) water quality standards. Clearly, the general public does not begin to understand the effect "new" environmentalism is having on the private sector, particularly those of us involved with natural resources."	Comment noted
3) "The environment should not take precedence over man at any costs. Our country's economic foundation is based on the economies of mining, fishing, agriculture, and logging. We import a large percentage of these products to the detriment of our local producers because it is cheaper for the American consumer, which in large part is due to the strict environmental standards increasingly demanded from our produces. The American public does not or cannot demand these same environmental standards from producers outside our borders, yet willingly accepts this double standard."	Comment noted.
4) "Natural resources are of utmost importance. Certainly, the ecological condition on both the private and public sector have improved in the last fifty years. To be successful in the ranching industry our rangeland must remain sustainable, and we are proud of the improvements we have made. People who have chosen to live and work on the land they love and care for, have an intimate knowledge of the environment that surrounds	Comment noted.

them. Protecting our country's producers should be the cornerstone from which we commonly strive to protect our environment."	
5) Private property rights are the single most important value to landowners: Private property rights must be respected. It is inconceivable that any government agency would conduct research on private ground without asking permission first and notifying landowners of their presence.	Comment noted.
6) Research:	
a. Sufficient research should be conducted to support any finding. Sufficient research may be proportionally defined by the potential time and money required to rectify a negative finding. Since landowners would be knowledgeable of the practical factors involved in recovery, they should be included in formulating costs of recovery efforts, which would aid in establishing adequacies of research.	Comment noted.
b. If research is lacking consideration should b given to abandoning further action."	DEQ is legally compelled to complete the Mid Snake River/Succor Creek TMDL by December 2002.
c. Recovery efforts must include well-defined, achievable results.	DEQ agrees. This information will be further defined in the implementation plan.
d. The DEQ has the responsibility to provide sufficient data and provide for a legitimate recovery plan if warranted. Suggesting a recovery effort without first providing an adequate basis or demonstrating an achievable result would irresponsibly place undue burden on the landowner.	DEQ agrees. A recovery plan has yet to be developed. It will be the responsibility of the landowners and the designated agencies (DEQ, BLM, SCC, IDL, etc) to develop the implementation/recovery plan.
e. While the DEQ may not legally impose a recovery effort on private ground, our experience is that agenda-driven environmental groups may impose the recovery through court order.	Comment noted.
7) Landowners have intimate knowledge of their land:	
a. All landowners affected by the Mid-Snake River/Succor Creek SBA and TMDL should be notified	DEQ has made every attempt to provide notification thus far. DEQ also relies on the WAG to disseminate information.
b. Landowner's local expertise and knowledge should be included in developing recovery efforts on private ground	DEQ agrees. This cooperation will be critical when developing the implementation plan.
c. Recovery efforts should have full cooperation from the landowner	DEQ agrees.
8) Funding	

a. All funding for research and recovery efforts should come from state and federal government. Current 303(d) standards for water quality have been raised as deemed appropriate by the government while not necessarily providing increased protection for the environment or in consideration for adequate protection of the landowner. For example, according to current 303(d) standards, the limiting sampling data available for temperature in Upper Succor Creek indicates stream temperatures are inadequate for salmonid spawning, yet many people enjoy fishing this stretch of stream for trout ever year. If in accordance to the current 303(d) standards, this stretch of stream needs recovery to sustain trout populations that are already occurring, what burden if any should be placed on the landowner?	The subbasin assessment and TMDL were developed using privately and publicly generated data. The privately generated data were willingly shared with DEQ. In terms of recovery efforts, local participation is critical. Without it, recovery, where needed, will most likely not occur. Other than in areas where implementation measures are to meet the water quality standards, no burden should be placed on the landowner, and even in such cases actions remain voluntary.
9) On the ground implementation—Recovery Efforts should be flexible:	
a. As more information is gathered, recovery efforts should be flexible enough to assimilate new information	DEQ agrees. The adaptive management approach will build this type of flexibility into the implementation process.
b. Natural occurrences such as fire, flooding, insect damage and disease may have a profound effect on recovery efforts.	DEQ agrees.
10) Page 13-paragraph 4: "The loss of desert riparian habitat that cools stream temperatures…" Where is the documentation to validate the statements made in this paragraph?	DEQ has shown in the document (Page 167), and the WAG has agreed, that 55% riparian shading represents a preliminary estimate of the riparian potential for Upper Succor Creek. Current conditions range from 13-16% (Table 53). An increase in the surface area of a stream exposed to sunlight leads to an increase in water temperature. This information substantiates that "a loss of riparian vegetation (shading)" increases water temperature.
11) Page 13, paragraph 4, regarding fisheries data for tributaries in Table 2: We question whether redband trout is a native or an introduced species. Idaho Department of Fish and Game have repeatedly planted fish at Chipmunk Meadows.	The Federal Clean Water Act and the Idaho Water Quality Standards require DEQ to protect *existing uses* as well as those used designated in the standards. The natural and historic presence of redband trout in the watershed is well documented in scientific literature.
12) Page 14, Table 2, In the back of the TMDL documents reference is made to the data collected regarding fish. There are copies of the correspondence between the IDEQ and IDFG. No hard data is shown to document this chart.	A footnote will be added to Table 2 indicating the method(s) by which the data were collected. In most instances, the data were collected using a backpack electrofisher.

Historically, information given by the members of the Chipmunk Grazing Association states that in over thirty five years, there have been very few, if any, fish observed from the headwaters of Succor Creek to Granite Creek.	
13) Pages 27-40 Regarding Subwatershed Characteristics. Pertaining to the above pages, DEQ has maps of all the subwatersheds except for Lower Succor Creek. The lower portion of Succor Creek is included in this TMDL, but is 'lumped' together in the watershed. DEQ needs to identify Upper Succor Creek and Lower Succor Creek as different subwatersheds. The data for Upper Succor Creek and the data for Lower Succor Creek should be addressed for each subbasin individually.	An additional map delineating Lower Succor Creek from Upper Succor Creek will be added to the document.
14) Page 41, History and Economics- "The introduction of cattle resulted in … soil compaction." "The change in plant composition resulted in a greater frequency of fires in the area." This is not true. Before the Taylor Grazing Act, large numbers of cattle and sheep grazed the rangelands and this reduced the fuel loads that would carry fire. The last paragraph on page 41 states "Grazing has had long-term effects on stream hydrology and vegetation. The introduction of cattle resulted in a decrease of native perennial grasses and an increase in soil compaction because of trampling by concentrated numbers of livestock." There is no reference to the actual facts of this statement. If these statements are to remain in the TMDL they must be documented for credibility.	Additional narrative regarding the Taylor Grazing Act will be added and references added.
15) Page 51 Table 7, In regards to the fish mortality study cited in this chart, there is question to the practicality of applying this model to a real stream. This test is done by thermally induced temperatures, similar to a "boiling pot". Streams do not naturally increase in temperature in this same fashion. If Table 7 is included in this TMDL a reference and description of how this experiment was conducted should be included.)	Clarification of the study and modification of the table will be incorporated into the TMDL.
16) Page 58-59 Date Assessment Methods - It would be beneficial to also use the Proper Functioning Condition (PFC) as an assessment tool. The BLM has reference manuals for this and there is a Standard Stream Riparian PFC Checklist that can be used as another tool for data assessment. In addition, if through this data assessment method a stream is determined to be in proper functioning condition, it may then be beneficial to determine if there is a need for further	DEQ agrees that the Proper Functioning Condition protocol is a valuable tool and intends to integrate it into the TMDL implementation plan as one option for tracking and documenting management actions. Unfortunately, PFC is not designed to calculate sediment loading nor determine if all the designated uses associated with water quality are met. As such, it was not used in TMDL development.

TMDL development on that stream. PFC would prove to be an additional tool to help in the Stream Bank Erosion Inventory addressed on page 59.	
17) Page 65- Figure 2.4 July 14, 2002. Fish kill on the Snake River at Walters Ferry. The statements made in the first paragraph in sentences five and six are enough explanation without a picture of this magnitude. The picture is not crucial in making the point. This picture could very well create bias and/or a negative impression. It is recommended to leave the statements in but remove the picture.	This picture is evidence of impairment of beneficial uses due to high temperature. Additional narrative is included to indicate that this is not representative of all parts of the watershed and indeed occurred in response to a combination of very high elevated air temperatures and low summer flows.
18) Page 115, Surface Hydrology—The statement within this paragraph "There are relatively few major diversions or other modifications on Upper Succor Creek." This is an inaccurate statement. There are four major diversions with adjudicated water rights on Upper Succor Creek above the Succor Creek Reservoir.	The document will be changed to reflect the fact that there are four adjudicated diversions above Succor Creek Reservoir.
19) Page 117, Pertaining to bacteria: there are no data available for Upper Succor Creek	Bacteria conditions were not assessed for Upper Succor Creek.
20) Page 117, In reference to Succor Creek Reservoir—The Succor Creek Improvement Co. has drained the reservoir several times to work on the head gate. The Idaho Fish and Game Department shocked the fish as they were draining the reservoir and transplanted them elsewhere.	DEQ will add text to the document to reflect the comment. However, this maintenance is not part of the reservoirs normal operational procedure.
21) Page 120, There are no water column sediment data available for Upper Succor Creek	Water column data is of less utility when bank erosion is the primary source of sediment.
22) Page 123, There is not a numeric value against which TSS conditions in Succor Creek can be compared. Site-specific conditions must be assessed to get accuracy.	The Idaho Water Quality Standard for sediment is narrative, meaning there is no numeric value with which to compare results.
23) Page 124, Re. Wolman Pebble Count—there is insufficient hard data to support the "data assessment methods sections describe linkage etc.)	The assessment method is documented in the text on page 124 and in the 'References Cites' section as Wolman (1954). The Wolman (1954) pebble count procedure is a well know and often used (by many states) method of determining particle size distribution.
24) Page 125, Paragraph two below Table 33. Regarding the Data Assessment Methods there is no hard data to support the statement "data assessment methods section describe linkage that has been developed between bank stability and fine substrate material."	Other TMDLs developed by DEQ have used similar linkages (see Referenced Cited, DEQ 2001 a,b). Additionally, this TMDL supports the linkage. In segments of Upper Succor Creek where banks were <80% stable, the percentage of fine material (particles <6mm in diameter) exceeded 28%. In segments where banks were >80% stable, the percent fine material was less than 28%.

25) Page 125, regarding temperature the period of collection is questionable due to access and vandalism.	Comment noted.
26) Page 126, There is no data available during the spawning period	Comment noted.
27) Page 129, Figure 2.53 and Figure 2.54, Assumed temperatures are used before 6-6-95	Comment noted.
28) Page 132 First paragraph, last four lines- "However, due to insufficient data, the entire critical period for cold water aquatic life cannot be evaluated. Data not available for the period between August 22 and September 21.	To account for the data gap, DEQ assumed that all temperatures prior to the date when data became available were BELOW the criteria, which may not be the case. Using this assumption, greater than 10% of the data still exceeded the spawning daily average criterion (as shown in Table 35).
29) Page 133, due to insufficient data the entire period cannot be evaluated as necessary for accurate results.	DEQ acknowledges that data for the entire critical period would increase the accuracy of the document.
30) Page 133, During the period of August 22 to September 21 there is no data available and therefore "assumptions" were made. There is also reference on this page to "However, again due to insufficient data…"	Comment noted.
31) Page 133, Actual data collected was from June 19-July 15 and then "assumptions" were again made.	Comment noted.
32) Page 134, In the first paragraph it refers to no data being available above the reservoir and then goes on to explain that because of that DEQ assumes that segment to also exceed the criteria. Assumptions on Upper and Lower Succor Creek being the same should not be made. The statement made in the second paragraph on this page, next to the last sentence, "… a determination is difficult to make due to limited data…"	The assumption being made is that since daily average temperatures in the stream from the headwaters to end of Chipmunk Meadows are above the criterion, it is likely that temperatures from Chipmunk Meadows to above the reservoir are also above the criterion. No comparison is being made to Lower Succor Creek, which extends from the Oregon line to the Snake River.
33) Page 136 Paragraph one, line three ".. DEQ acknowledges there are additional data that would be helpful to increase the accuracy of the analyses. "this in regards to the data gaps. Again it is questionable whether there is enough basic data to make assumptions or to plug into the models for temperature. In the paragraph right below Table 37, this paragraph addresses that efforts will be made to fill the data gaps, however it is questionable with the amount of data collected whether it validates the TMDL. It is questionable as to how recommendations for TMDL Implementation can be made if more data is needed.	The model validation work in Appendix G shows that in fact, the model was quite reliable at calculating the actual stream temperature. DEQ feels that enough data were collected to develop the TMDL, but acknowledges that additional data would improve the accuracy of the allocations. It terms of TMDL implementation, the ensuing plan will take an adaptive management approach. This means that progress toward meeting the TMDL goals will be tracked as control measures are implemented. As such, data gaps do not preclude moving forward with implementation.

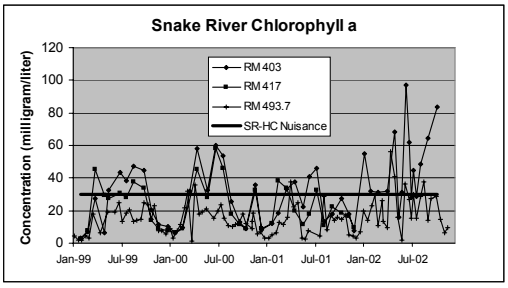
34) Page 142, Fourth paragraph, third sentence under the Temperature heading "…and a loss of riparian shading.: Is this a substantiated statement and if so, by what source, or is this an assumed statement that there has been a loss of riparian shading. There should be reference data and/or pictures to support his statement or else that portion of the statement should be removed.	The geomorphology of Upper Succor Creek is such that there should be greater than 13-16% shading, which is where the stream lies currently (Table 53). DEQ has shown in the document (Page 167), and the WAG has agreed, that 55% riparian shading represents a preliminary estimate of the riparian potential for Upper Succor Creek. Given that current shading ranges between 13-16%, movement toward the potential is appropriate.
35) Page 153, Monitoring Points—In regards to this paragraph, it is questionable as to whether sufficient data has been collected on Upper Succor Creek to get accurate data from enough segments of the stream to produce recommendations for the TMDL. There is reference at the end of this paragraph that this was due to lack of access to private property. It should be noted there was never any written request to the Chipmunk Grazing Association of which I am a member, for access to these private properties, therefore access was never approved or denied.	DEQ feels that the best available physical, chemical and biological data were used to develop the subbasin assessment and TMDL. DEQ is legally compelled to complete the Mid Snake River/Succor Creek TMDL by December 2002. Given the short time frame, DEQ collected as much additional data as possible to aid in development of the subbasin assessment and TMDL. Regarding access to private properties in Upper Succor Creek, the comment that access was never approved or denied is noted.
36) Page 209, The statement referring to the Mid Snake/Succor Creek subbasin assessment uses the site-specific spawning period for redband trout. The basin specific spawning period is March 1 through June 15. There is not site specific data pertaining to Upper Succor Creek. Readings were taken mostly in June. The critical time stated for spawning is earlier in the year.	The temperature data displayed on pages 127-131 are in fact basin/site specific (to the Mid Snake/Succor Creek basin). However, DEQ agrees that in most cases data were not available for the extent of the spawning period. To account for that data gap, DEQ assumed that all temperatures prior to the date when data became available were BELOW the criteria. Even with this assumption, greater than 10% of the data still exceeded the spawning daily average criterion (as shown in Table 35).
37) In reference to the chart on page 116, Table 30. Flows in Upper Succor Creek—these flows are not accurate. For thirty-five years the members of Chipmunk Grazing Association have never witnessed these excessive flows at that time of year. Where is the documentation to support this chart?	It is DEQ's belief the flows shown in Table 30 are accurate. The flows were determined following the standard set-interval method using a calibrated Marsh-McBirney flow meter. The documentation to support this chart is located in the Boise Regional Office files.
Comments From: Brian Hoelscher, Biologist II, Environmental Affairs Idaho Power Company Received via e-mail: February 28, 2003	**DEQ Response:**
1) "IDEQ continues to address water temperature issues in an inconsistent manner. In the introductory portions of the Succor TMDL, IDEQ explains that TMDLs are plans developed to improve water quality by reducing pollutant loads and that EPA considers certain "unnatural conditions," such as flow alteration and habitat	DEQ's approach to temperature in the Mid Snake-Succor TMDL is consistent with past efforts and EPA approved TMDLs. The SSTEMP model has been used a variety of TMDLs (Rio Chamita, New Mexico; Upper Ponil Creek, New Mexico; Navarro River, California). All TMDLs mentioned are approved, and thus DEQ believes the approach used

modification, to be pollution and not pollutants. This distinction between "pollution" and "pollutants" is subtle, but important, under the Clean Water Act. TMDLs are not required for water bodies impaired by pollution, but not by specific pollutants that are recognized under the Clean Water Act (*Id.* pg. 7, see also: I.C. §39-3611). "Heat" is a pollutant when discharged to a water body (I. C. §39-3602(19)), but water temperature is not, it is the condition resulting from the imposition of the heat pollutant. The Succor TMDL attributes changes in water temperature to various sources of heat: Increases and decreases in water temperature are due to the amount of heat reaching the water. There are several factors that contribute to the amount of heat reaching the water in the Mid Snake River/Succor Creek watershed. The anthropogenic factors include agricultural return water, agricultural withdrawals, dams, and a loss of riparian vegetation (shading). Natural factors include seasonal air temperature changes, natural dams, and naturally warm springs that feed water to the stream. Only those anthropogenic sources (of heat) that are directly controllable are addressed in this TMDL. (*Id.* pg. 142.*)* In the Succor TMDL, IDEQ assigns temperature load allocations only to stream shading (*Id*. pg. 166) in an attempt to address the loss of riparian habitat. All other anthropogenic sources of heat, while acknowledged, are disregarded.	is appropriate as described in 40 CFR 130.2(g).
In the U.S. Environmental Protection Agency approved Payette TMDL, IDEQ found that water temperatures in the watershed exceeded temperature water quality standards for cold water aquatic life and salmonid spawning, and, as in the Succor TMDL, attributed those temperature exceedances to various factors, including the anthropogenic influences of habitat modification, flow alteration and warm water temperatures originating from Black Canyon Reservoir. However, unlike the Succor TMDL, IDEQ recommended that a temperature TMDL <u>not</u> be developed in the Payette TMDL "due to external sources of warm water temperatures and habitat modification."	A temperature TMDL was not prepared for the Lower Payette River because water entered the study area at temperatures above the water quality standard due to its tenure in Black Canyon Reservoir. It is DEQ's belief that this situation is not similar to the Snake River and its tributaries from CJ Strike Dam to the Oregon Line. It is also DEQ's belief that temperature TMDLs were performed for the appropriate streams in the watershed.
In the initial development of the draft Snake River–Hells Canyon TMDL, IDEQ took a similar approach, identifying various anthropogenic sources of heat, which influenced water temperature, but generally ignoring them. IPC concurred with this approach because, as in the	Comment noted.

Payette TMDL, IDEQ treated all anthropogenic temperature influences in the watershed equally and did not attempt to make-up for the ignored effects of some influences by allocating additional, disproportional load allocations to other specific anthropogenic influences, such as the Hells Canyon Complex.	
The Succor TMDL illustrates that IDEQ has yet to settle on a uniform approach to the development of temperature TMDLs. For instance, many waters in the Succor TMDL are listed as impaired for exceeding applicable temperature standards because of natural and anthropogenic influences. However, IDEQ disregards all anthropogenic influences except for riparian shading. Moreover, IDEQ recommends that several waters that are listed as impaired by temperature be delisted because flows are less than one cubic foot per second. IDEQ's policy choice to disregard the impact of low flow tributaries is undeveloped in the record and fails to recognize the cumulative impact of the disregarded anthropogenic sources of heat on overall temperature conditions of the watershed.	Comment noted.
The development of a temperature TMDL, which is a plan or budget intended to guide improvements to water quality, in a unified watershed like the Snake River basin cannot be done in an inconsistent patchwork manner. Disregarding some anthropogenic influences or heat sources and addressing temperature conditions through only those anthropogenic sources that are "controllable" results in disproportionate load allocations to some sources and none to others. The question of whether an anthropogenic influence can be "controlled" should not be determinative of whether the level of impact of the influence should be assessed. IDEQ stresses that flow alteration is not a pollutant and thereafter concludes that the effects of flow alteration should not be considered in the Succor TMDL. IPC concurs with the underlying premise but not with IDEQ's conclusion. I. C. § 39-104 prohibits IDEQ from abrogating, injuring or otherwise affecting the beneficial use, including the diversion and storage, of water pursuant to a vested water right. As such, IDEQ cannot "control" those anthropogenic influences, such as flow alteration, that result from the beneficial use of water pursuant to a valid water right. <u>But</u>, to ignore that such uses affect water temperature and fail to assess the level of that impact in comparison to other thermal impacts in a basin inequitably increases the load allocations to those	DEQ recognizes that flow alteration may result in higher water temperatures. However, DEQ has never had statutory authority to influence water rights.

anthropogenic sources that IDEQ considers to be controllable. IPC submits that the only equitable approach to the development of temperature TMDLs in the Snake River basin is to initiate a broad watershed temperature analysis and then, after all sources of anthropogenic thermal impacts in the interdependent watersheds have been identified and assessed, attempt to allocate loads over the entire region fairly. If it is IDEQ's choice to address temperature TMDLs water-by-water within the Snake River basin, please provide IDEQ's policy on whether the effects of flow alteration are considered in the development of temperature loads and allocations in TMDLs."	Flow alteration is not considered in the development of a TMDL because by the EPA's definition, it is not a pollutant.
2) "We have noted a couple minor errors in the Succor TMDL as it relates to IPC projects. The upper river mile for the Swan Falls Reservoir pool is incorrectly identified as mile 457 (*Id.* pg. 24). This is below the dam. IDEQ identifies specifically a C.J. Strike Reservoir TMDL (*Id.* pg. 153). It is IPC's opinion the development of TMDLs is to occur by hydrologic unit and not water body specific. Please correct or clarify the statements."	These errors will be corrected.
3) "The Succor TMDL mentions (*Id.* pg. 73) the occurrence of the listed endangered Idaho spring snail. It does not discuss consultation with the U.S. Fish and Wildlife Service. Please discuss any consultation the IDEQ has had with the agency and how the Succor TMDL complies with the Endangered Species Act regulations."	Consultation is the responsibility of the EPA. Part of the recovery plan from USFWS states, " Ensure state water quality standards for cold-water biota and habitat conditions so that viable, self-reproducing snail colonies are established in free-flowing mainstem and coldwater spring habitats within specified geographic ranges or recovery area." Snake River Aquatic Species Recovery Plan, December 1995, USFWS, Idaho. This section of the Snake River is not in the recovery area. However, this TMDL does ensure that water quality standards for cold-water biota are being met. The Idaho Spring Snail habitat includes mud or sand associated with gravel-boulder size substrate. BMPs implemented for nutrients/temperature/sediment on the tributaries will result in a decrease in sediment loading to the mainstem Snake river, potentially improving habitat.
4) "Castle Creek and North Fork Castle Creek are listed for temperature. The Succor TMDL conclusions (*Id.* pg. 88) are not consistent with either the reported findings (*Id.* pg. 82 and pg. 87; Figure 2.24) nor the recommended load allocations and delistings (*Id.* pg. 4). It appears there was confusion whether the Succor TMDL was	Both Castle Creek and North Fork Castle Creek need additional data collected in order to determine whether or not a TMDL is necessary. This error will be corrected. North Fork Castle Creek is not being recommended for de-listing. The temperature TMDL is delayed

discussing Castle Creek or North Fork Castle Creek. Please clarify on which of these streams temperature TMDLs will be required."	due to insufficient data.
5) "IDEQ has identified as one of their data assessment methods the *DEQ-Water Body Assessment Guidance-Second Edition*. This guidance further provides a revised *Temperature Frequency of Exceedance Calculation Procedure.* It states (*Id.* pg. D-1), "For cold water aquatic life the summer period of June 21st through September 21st shall be considered the period of interest…" and (*Id.* pg. D-2) "…the critical time period is from July 15th through August 15th ..." It further states (*Id.* pg. D-2), "For purposes of evaluating a frequency of exceedance partial data records that do not include the critical period are inadequate...and can not be used to determine compliance with Idaho's temperature criteria." It appears IDEQ is recommending North Fork Castle Creek and Squaw Creek for delisting based on temperature data, as provided in Figure 2.24 (*Id.* pg.87) and Figure 2.41 (*Id.* pg. 113), below the maximum daily average temperature criteria. The uses in both North Fork Castle Creek and Squaw Creek are the presumed uses of cold water aquatic life and primary or secondary contact recreation. Additionally, Cottonwood Creek is listed for temperature. It is being recommended for delisting because numeric criteria are exceeded less than 10% of the time (*Id.* pg. 132). Its uses are similar to those of the other tributaries. As provided in the Succor TMDL, there were no data available for any of these tributaries during the critical period and relatively little data during the period of interest: only about 21 d (June 21 through July 11) in North Fork Castle Creek; only about two days (June 21 through June 22) in Squaw Creek; and only about 19 d (June 21 through July 9) in Cottonwood Creek. According to Idaho's guidance and procedures, it appears these data were inadequate for determining compliance with Idaho's temperature criteria. Please provide IDEQ's interpretation of these guidelines and procedures as they were relate to the Succor TMDL."	Squaw Creek and Cottonwood Creek are being proposed for delisting primarily due to the intermittent nature of the stream. By late June, flows were below 1 cfs or the stream was dry throughout the listed reach. State water quality standards do not apply in those periods where flows are below 1 cfs. Prior to that period, Squaw and Cottonwood Creeks met the temperature standard. Initially, DEQ did not do an intermittence evaluation of these streams but the data shows that they are intermittent and meet water quality standards when water is present. Thus, this determination to de-list is both reasonable and defensible.
6) "Total suspended sediment targets are proposed for two streams: 65 mg/L in Jump Creek and 16 mg/L in Succor Creek. Each is stated to be necessary to protect similar uses. The Jump Creek target was based on regression analyses relating total suspended sediment concentrations to turbidity measures. The target was established at the turbidity criteria. This target corroborates with that of other researchers (*Id.* pg. 53). The Succor	As stated in the document, the TSS targets for Lower Succor Creek and Jump Creek differ due to the different methods by which they were determined. The target of 65 mg/L in Jump Creek is linked via regression analysis to maintaining 25 NTU turbidity. Maintaining 25 NTU in Jump Creek will satisfy the Idaho Water Quality Standards. The target of 16 mg/L (which has been changed to 22 mg/L in the final document) is the irrigation season

Creek total suspended sediment target was set at 16 mg/L. This is representative of concentrations at the Oregon/Idaho line. Please provide rationale why there is such a discrepancy in the targets. It appears the Succor Creek target is established at a level more reflective of system potential and not at a level that (*Id.* pg. 150) "is the opinion of DEQ…will be protective of both aquatic life and water quality."	concentration in Succor Creek above Sage Creek. Twenty-two (22) mg/L (previously 16) is linked to conditions in the Lower Boise River where the Idaho Water Quality Standards are met. As such, the Succor Creek target is **both** system potential and protective of both aquatic life in Succor Creek.
7) "IPC agrees 0.07 mg/L total phosphorus is a reasonable target for the Succor TMDL and that equal concentration allocation is a reasonable approach. We do not however believe application of this target solely during the critical period of May through September will reasonably assure protection of the uses. IDEQ states, "(*Id.* pg. 154) Transport and deposition of phosphorus, and the resulting algal growth within the reach, is seasonal in nature," and "(*Id.* pg. 155) Generally, water temperature precludes nuisance blooms from occurring in early spring and late fall." A nuisance threshold of (*Id.* pg. 76) between 25 and 30 µg/L of chlorophyll-a have been established as the chlorophyll-a targets for this TMDL." Figure 1 shows that nuisance levels of chlorophyll-a can occur as early as January and frequently occur in March. Please clarify how the nutrient critical period of May through September reasonably assures protection of the uses."  Figure 1. Chlorophyll-a concentration in the Snake River from C.J. Strike Reservoir to the Idaho/Oregon line with reference to the proposed Mid Snake-Succor Creek TMDL target of 30 µg/L.	As nutrient loading decreases to the system, total phosphorus retained in the system will also decrease (i.e. sediment bound phosphorus levels will decrease as less phosphorus enters system and this phosphorus is flushed out of the system). In concert with reductions from TMDLs implemented upstream, this reduction in entrained phosphorus will result in a decrease in Chl-a concentrations seen outside the critical period. If the Snake River does not meet its target milestones during the implementation period, the critical period will be reevaluated.
Comments From: Amy Woodruff, P.E. City of Marsing, City Engineer Received via e-mail: February 27, 2003	**DEQ Response:**
1) "As the City Engineer of the City of Marsing, and at the request of the City of Marsing Mayor and City Council, I am requesting the permit discharge levels for the City of Marsing wastewater treatment plant not be changed."	Currently, the TMDL allows for the city of Marsing to remain at current discharge levels. Given that the city is well below their design capacity, an adequate amount of time has been given to the city to determine other treatment possibilities and funding

	mechanisms to meet nutrient targets.
2) "The wastewater treatment plant was designed to treat the sewage of approximately 1300 individual homes. The wastewater treatment plant currently serves the equivalent of 500 homes, more or less. Also, the excess capacity allows for better treatment of the effluent. The lower (actual) discharge, coupled with the higher quality effluent, may make the impact to the watershed less than projected in the TMDL."	See above.
3) "Altering the permit discharge levels could lead to a very negative economic impact to the residents of the City of Marsing."	See above.
4) "The City of Marsing wastewater treatment plant operates safely and efficiently. The wastewater treatment plant is well maintained and the operations are well documented."	See above.
Comments From: Hilarie Engle Committee for the High Desert Received via e-mail: February 28, 2003	**DEQ Response:**
1) "CHD believes that this document has a long way to go before any of the decisions can be put into place."	Comment noted.
2) "CHD requests that the DEQ review data collected by the BLM that documents the harmful livestock grazing impacts to the watersheds covered in this document. The overwhelming body of evidence in the BLM documents point directly to livestock grazing as the cause of watershed-level devastation here."	The Idaho Rangeland Standards and Health Guidelines outline the Bureau of Land Management's range management goals. One of these goals is the compliance with Idaho Water Quality Standards, of which is addressed by the TMDL. However, these EA's offer no new water quality data that would alter the SBA/TMDL conclusions.
3) "For ALL data discussed or analyzed in your assessment, please provide information on whether livestock grazing was occurring during the period when the data was collected."	This type of information is generally not available. Livestock grazing is a land use in the watershed.
4) "CHD contends that the new process (WBAG II) developed by DEQ for identifying whether a water body supports its beneficial uses or is impaired and the associated process (BURP) for collecting, analyzing and managing the data used in making these determinations do not comply with the requirements of the Clean Water Act, its implementing regulations, nor EPA guidance."	DEQ took several steps to ensure that WBAG II complies with the Clean Water Act and related EPA guidance. First, DEQ coordinated extensively with EPA throughout the WBAG development process. Although EPA does not have the authority to approve or disapprove DEQ's assessment methodology, DEQ wanted to ensure EPA's understanding and satisfaction with the WBAG before using it. With this in mind, DEQ asked EPA for an in-depth review of the draft WBAG II before it was released for public comment.

	EPA reviewed the WBAG II and provided DEQ with comprehensive comments from technical and policy perspectives. The EPA reviewers possessed a wide range of expertise including fish biology, ecology, monitoring, program policy and legal (Grafe et. al 2002). The review included EPA Region 10 Idaho Operations office (Boise, Idaho): Leigh Woodruff. Also, from EPA Region 10 office (Seattle, Washington): Kerianne Gardner, Gretchen Hayslip, Lilian Herger, Curry Jones, Marcia Lagerloef, Theresa Pimentel and Steve Ralph. Lastly, from EPA Headquarters (Washington, D.C.): Susmita Dubey (Office of General Council); Susan Holdsworth, Mike Haire, Chris Faulkner, Christine Ruf (Office of Wetlands, Oceans and Watersheds); Sue Gilbertson, Ed Hanlon, Jennifer Wigal (Office of Science and Technology). The second step DEQ took was to participate in and follow closely the development of EPA's national monitoring and assessment guidance, the Consolidated Assessment and Listing Methodology (CALM) (EPA 2002). The overall goal of CALM is to both strengthen and streamline the water quality monitoring, assessment and listing process for purposes of both sections 305(b) and 303(d) of the Clean Water Act. CALM encompasses components such as making decisions on attainment/non-attainment of state water quality standards and designing comprehensive state monitoring networks that support attainment decisions. To the extent possible, DEQ drafted WBAG II to closely follow CALM guidance. Finally, DEQ used several different approaches to ensure the public had an opportunity to learn about the assessment process and provide valuable input. Some of the extra steps DEQ took included holding an extensive 120-day public comment period, sending individual invitations to interested parties and providing educational workshops. Feedback from the different public process approaches strengthened WBAG II and verified it met Clean Water Act requirements. Using the combined approaches described above, DEQ is confident that WBAG II complies with the requirements of the Clean Water Act, its implementing regulations, and EPA guidance. Literature cited: EPA. 2002. Consolidated Assessment and Listing Methodology – Toward a Compendium of Best Practices. U.S. Environmental Protection Agency, Office of

	Wetlands, Oceans, and Watersheds, Washington, D.C. pp. [various pagination] Grafe, C.S., D.A. Essig, M.J. McIntyre, D.H. Brandt, C.A. Mebane, and M.R. Edmonson. 2002. Public Involvement and Response to Comment Summary –The Water Body Assessment Guidance, Second Edition. Idaho Department of Environmental Quality; Boise, Idaho. 232 pp.
5) "By implementing WBAG II and BURP in the development of the Mid Snake River/Succor Creek Subbasin Assessment and TMDL, the DEQ failed to consider all of the readily available data, did not collect or consider a substantial amount of available data, failed to conduct adequate monitoring and inappropriately de-listed or failed to list streams on the 303(d) list, and therefore a TMDL will not be developed. When developing the Subbasin Assessment and TMDL, DEQ failed to consider all readily available data. The result is that many streams that are not, or are not expected to be, supporting their beneficial used were not added to the list, and many streams that are not currently supporting their beneficial uses were de-listed."	The best available data were used to develop the subbasin assessment and TMDL. If additional data exist, DEQ encourages stakeholders to submit the data as part of the §303(d) listing process.
6) "Sediment- The streams in this document need to be examined during periods of the year when they are loaded with sediment, not just at low-flow periods of the summer or before livestock are grazed in the area."	One of the goals of the SBA was to determine the water quality status with regard to the listed pollutants. The available data was used to establish load reductions where applicable. The state water quality standards have provisions that preclude sediment in quantities, which may impair designated beneficial uses. Improved bank stability and riparian vegetation, as is recommended in the document, will decrease sediment loads during high flow events.
7) "The DEQ should pay particular attention to the BLM data that shows ongoing failures by the livestock industry in nearly all Owyhee Resource Area grazing allotments to meet stubble height and trampling standards. Stubble heights were put in place to protect ongoing irreparable livestock damage to streams. Violations of these standards means that streams suffer widespread erosion during runoff periods. This runoff sweeps soils and abundant livestock waste into waters of the TMDL area. It is essential that the DEQ examine and collect data on sediment and other pollutants during runoff for all streams in the watersheds."	The intent of the subbasin assessment and TMDL is to determine if the water quality standards are met and if not, develop a mechanism to meet them. In areas where additional control measures are necessary to meet the standards, and grazing appears to be contributing to the problem (as determined by the appropriate designated agency), the BLM will be involved if necessary. Regarding collecting data during runoff, due to the nature of the flow regimes in the Mid Snake/Succor Creek basin, much of the data is in fact collected during the runoff period.
8) "This assessment inadequately addresses the role of intermittent streams in carrying sediment and other livestock caused pollution into the	As indicated in Appendix E, if one of the streams being evaluated for intermittence "is a large pollutant contributor to downstream waters (such as

streams assessed. Many of these streams are intermittent because of livestock damage; during spring runoff periods they can carry high volumes of sediment and other pollutants (livestock waste) in their waters."	the Snake River), the development of a pollutant management plan will be considered."
9) Bacteria- We request that before the DEQ prepares a Final Assessment/TMDL for these watersheds, bacterial data should be collected in all the streams. As bacteria and livestock fecal matter can contribute to algal growth, brownness, murkiness and other factors that cause turbidity and sediment impairment, it is essential that you do this- even on streams that have not been listed for bacteria so that you can better understand the contribution of these pollutants."	Unless a conclusive amount of data existed (as in the case of sediment for Jump Creek and bacteria for Lower Succor Creek), DEQ only evaluated the §303(d) listed pollutants for each stream. Comment noted.
10) We also request that the Final Assessment/TMDL more adequately address the bacteria caused by livestock grazing on public lands. Livestock use these waters as their private toilets, polluting the water extensively. Yet in this TMDL the words livestock and pollution rarely come up."	See above comment.
11) "Aesthetics- We ask that an analysis of livestock-caused water quality impacts be discussed. Any person recreating on public lands has witnessed the destruction left behind after a season of livestock grazing. The waters are disgusting- polluted beyond a level of tolerance. This is not an appropriate site for the wild lands of the area. The DEQ has failed to assess these for impaired aesthetic values."	To date, we have not received complaints concerning the aesthetic quality of the wadable streams evaluated in the Mid Snake/Succor Creek watershed. However, DEQ encourages public input such as this during the §303(d) listing process. Any other data submitted to DEQ will be evaluated through the Water Body Assessment Guidance to determine support of beneficial uses and future listing on the §303(d) list.
12) "Temperature- Again we ask that the DEQ recognize that lack of shading has resulted from prolonged over-grazing. The devastating effects to the riparian areas can be seen on almost any water body that is visited. Grazing is rarely brought up in this Assessment/TMDL, yet grazing is the root cause for much of the riparian damage."	The temperature TMDLs establish current shading conditions and preliminary shading potentials. The method(s) by which the shading potentials can be reached will evaluate current management actions (including grazing practices if applicable) to determine the necessary solutions.
13) "In order to fully consider and assess the appropriate controls and develop appropriate pollution control actions to limit pollutant loads in the watershed, the DEQ must first recognize and address the causes of the pollution."	DEQ agrees. This information will be gathered during development of the TMDL implementation plan.
14) "CHD would like to request that you analyze water samples from small streams, reservoirs, and springs and seeps for hormones and other chemicals stemming from growth implants in cattle. This is necessary for the simple fact that even in small concentrations the hormones/chemicals can affect aquatic	Investigation of hormones and other chemicals stemming from growth implants in cattle was not within the scope of this document. If data exists which indicates streams are impaired from these types of substances, DEQ encourages public input with appropriate data to support this position during the §303(d) listing process.

organisms."	
15) PG. 4-5, "We do not support these de-listings and believe that the DEQ has not considered all readily available data as required by the Clean Water Act when making these de-listing determinations. These de-listings cannot happen until the livestock issue is address by all agencies dealing with the area. DEQ cannot de-list for temperature until the riparian areas are allowed to re-establish themselves, and this will not happen until the livestock are removed from the area. The same is true for bacteria and sediment. DEQ must address the root causes for these problems and address those before any action can be taken to de-list."	The subbasin assessment and technical appendices show that the streams in Table B being proposed for de-listing are meeting the Idaho Water Quality Standards for the §303(d) listed pollutant(s), regardless of landuse. As such, de-listing for those pollutants is justified.
16) Pg. 57, "When talking about the link between sediment and sediment-bound nutrients, the USDA stated, "the best and most efficient method of controlling growth is by reducing surface erosion and sedimentation". Most of the erosion in the area is caused by over-grazing of livestock. These areas are so heavily used, the land never has a chance to re-grow and stabilize. When the DEQ addresses over-grazing issues then you will be able to address sediment and nutrients."	As indicated on page 57, the USDA statement "the best and most efficient method of controlling growth is by reducing surface erosion and sedimentation" is in reference to the control of aquatic macrophytes. Aquatic macrophytes do not present a water quality problem in the streams assessed.
17) Pg. 59, "You say that for "streams listed for temperature, the pollutant is heat. Streams that have increased width/depth ratios and decreased riparian shading are more susceptible to elevated stream temperatures". Again, the DEQ does not state that both of these problems are associated with livestock grazing."	The intent of the discussion on page 59 is to introduce how SSTEMP will be used in the TMDL to develop "heat" based allocations.
18) Pg. 60, "DEQ states that four stream segments contain erroneous salmonid spawning beneficial use designations. If DEQ is changing the designated beneficial use for these four stream segments, then they must first conduct a Use Attainability Analysis, as required by the Clean Water Act and its implementing regulations. 40 C.F.R. § 131. This is required for any changes to beneficial uses being made. What will be the beneficial uses and criteria of these streams if they are no longer designated for salmonid spawning?"	DEQ will clarify this statement. The intent of the correspondence between DEQ and IDFG is to show that while it may be appropriate for an entire stream (headwaters to mouth) to be designated for salmonid spawning, spawning does not actually exist throughout the entire stream. Very low gradient response reaches, such as those described in Appendix F, may never have been spawning reaches. They do, however, remain important migration corridors. As such, DEQ does not intend to remove the salmonid spawning designation.
19) Pg. 65, "You found that an Idaho Power study on the habitat of the Snake River Plain states that white fish kills are common in the Swan Falls area in the summer and are primarily due to elevated temperatures. We appreciate and support your decision to list the Snake River for Temperature. However, we are concerned with the failure to immediately develop the Temperature TMDL.	The statement "While the DEQ is de-listing streams immediately, it is not immediately listing streams…" is not correct. The process of §303(d) delisting and listing of streams is simultaneous. The actual delisting and listing of streams will most likely not occur until 2005.

While the DEQ is de-listing streams immediately, it is not immediately listing streams found to be violating water quality standards. It would be more efficient and effective to list and develop the TMDL immediately. Especially given the drought conditions which are sure to contribute to more fish kills this summer."	
20) Pg. 70-73, "White Sturgeon, a threatened species are found in the river below CJ Strike Dam and Swan Falls Dam. Unfortunately, it appears that there are few sturgeon to have shown up in your 2000 electrofishing results (p.71). In addition, the Idaho spring snail is located in the Assessment/TMDL area. It is not clear from the Subbasin Assessment/TMDL document whether the water quality standards are protective of these species, and how the TMDL's being developed will enhance these species' habitat. We would like additional information on macroinvertebrate and what conclusions can be drawn from the information. Was your office expecting to find more Idaho Spring Snails? Are populations increasing? How will TMDL's protect and restore these species?	Sturgeon are commonly found over a wide range of substrate although their preferred spawning areas are in turbulent areas of a river. This reach is low gradient with riffles but no significant rapids, limiting the amount of spawning areas. Idaho Power Company studies of sturgeon in this reach have not shown sturgeon mortality and did not result in significant movement changes. In addition, the authors of the report state that no reduction in fish condition was evident based on comparison to sturgeon populations below the Bliss Dam. As tributary streams/drains meet the TMDL targets the habitat of the spring snail and sturgeon will in all likelihood improve. The data-set that DEQ received on the Spring Snail was small and we could not draw conclusions on expected population dynamics of the spring snail.
21) Pg. 75, "CHD believes that it is important to complete a DO TMDL at this time. If the water bodies are violating water quality standards and not supporting beneficial uses because of low DO and for excessive nutrients and algae, then a TMDL should be developed immediately. We are concerned that this failure to develop a TMDL at this time. Again, it would be more efficient and effective to develop a TMDL immediately."	Insufficient DO data was available. Data provided by Idaho Power showed that DO standards were met by IPC below Swan Falls Dam and CJ Strike dam. DO will improve in concert with nutrient reductions.
22) Pg. 84, "You state that "the Castle Creek sample was collected in the middle section of the listed reach and indicates poor diversity within the aquatic insect community". What does this mean and what could cause such poor diversity of aquatic insects? How will the TMDL address this?"	Poor diversity is usually indicative of degraded habitat conditions. TMDL implementation should reduce sediment inputs to the stream, which in turn improves habitat conditions.
23) Pg. 87, "S. Fork Castle Creek Bacteria: The DEQ is de-listing the S. Fork Castle Creek for Bacteria despite their inability to re-sample the stream. However, DEQ claims that their water body assessment process shows this research to be fully supporting its beneficial use. CHD does not support this de-listing, especially since it is not based on any recent sampling of water quality. We would like to see DEQ's assessment for the S. Fork Castle Creek and a detailed discussion of how DEQ made this de-listing determination.	DEQ will delay the TMDL until bacteria data can be obtained in 2003.

What are the other uses of the S. Fork Castle Creek? DEQ is de-listing based on meeting recreational uses, however, what about all of the other designated and beneficial uses for these streams?"	
24) Pg. 134, "CHD supports DEQ's determination to conduct Temperature, Bacteria and Sediment TMDL's for Succor Creek to the Snake River."	Comment noted
25) Pg. 138-139, "CHD supports the TMDL's that will be done for the Snake River, Castle Creek, Jump Creek, North Fork of Castle Creek, Sinker Creek, and Succor Creek. Is there a specific timeline for these TMDL's to be completed?"	The TMDLs for these streams are presented in section 5 of the document. The TMDL implementation plan will be prepared upon TMDL approval.
26) "CHD does not believe that sediment and temperature should be de-listed from the water bodies that are mentioned on pages 138-139. There has not been enough research by your office to warrant these actions. Temperature cannot be de-listed until the root cause, grazing, has been addressed and a plan has been implemented to fix the problem."	The subbasin assessment and technical appendices show that the streams in Table 38 being proposed for de-listing are meeting the Idaho Water Quality Standards for the §303(d) listed pollutant(s). As such delisting is appropriate.
27) Pg. 148, "What "other appropriate measures" will be used when developing the TMDL's? Please list and explain each of the measures. How flexible are these other measures going to be? DEQ provides no cite to their claims that the Federal Rules allow annual or seasonal loads. TMDL means Total Maximum Daily Load, and this is how the load allocations should be developed."	The use of other measures primarily refers to the use of surrogates. For example, percent shading is used as a surrogate for heat (joules). Another example is the use of a 70 µg/l TP target as the nutrient surrogate for narrative water quality standard. The use of surrogates is necessary and practical, otherwise, TMDLs would appear in terms that are difficult to understand and monitor. The use of each surrogate measure is described in the TMDL. Regarding the use of annual or seasonal loads, as opposed to daily loads. Many pollutants cannot be meaningfully described as a daily load. As such, seasonal or annual loads are used.
28) Pg. 152, "Again, no mention of grazing as a cause to the down cut and vertical erosive banks. You state that the improvement of riparian vegetation density and structure would reduce the potential for temperature and bacteria loading in the future. This is good but how is this going to be achieved if grazing is not addressed? These areas are never going to be allowed to re-grow as long as grazing continues."	The appropriate management action to achieve compliance with water quality standards and restoration of beneficial uses will be addressed in the TMDL implementation plan.
29) Pg. 154, "Load Capacity should be monitored at all times of the year, not just during the critical conditions. If you base the amount just on these time periods, you may be missing some important violations."	One of the goals of the SBA was to determine the water quality status with regard to the listed pollutants. The available data was used to establish load reductions where applicable. The state water quality standards have provisions that preclude sediment in quantities, which may impair designated beneficial uses. Improved bank stability and riparian vegetation, as is recommended in the

	document, will decrease sediment loads during high flow events.
30) Pg. 163, "CHD would like to know who will be responsible for the monitoring of the LAs for bacteria in the flood plains and feeding operations? Will there be a specific monitoring schedule? What will be the consequence if the LAs are not met? The DEQ should determine, in developing the TMDL, what role pasture lands and feeding operations are contributing pollutants. The feeding operations must have permits. Are they complying with these permits?"	Load allocations (LAs) are developed for nonpoint sources, Wasteload Allocations (WLAs) are developed for point sources. We are assuming you are referring to nonpoint sources when flood plain is mentioned and point sources when feeding operation is mentioned. Designated management agencies (including DEQ) will use existing authority to regulate nonpoint sources on private, state and federal land (see reasonable assurance section of the document). For feeding operations, (those that meet the definition of CAFO) the facility must have a NPDES permit from the EPA. Currently, the Idaho Department of Agriculture administers the CAFO program in Idaho.
31) Pg. 173, "What is the time period for the general implementation?"	Development of the implementation plan will begin immediately upon approval of the TMDL. The time period for implementation will differ for every water body, but will be outlined in the plan.
32) "This TMDL should calculate time frames for recovery, removing impairment, based on no grazing, limited grazing, removal of livestock from most damaged watersheds, etc. scenarios. What will recovery time frames be under various levels of relief from livestock grazing? The publics is simply not willing to wait your estimated 20-100 years for achievement of water quality standards in these nationally significant public wildlands."	This is the type of information that would be helpful to have in the TMDL implementation plan. DEQ will rely on the affected stakeholders and the designated agencies to develop this kind typo of information.
Comments From: James Desmond Owyhee County Natural Resources Committee Received via e-mail: February 28, 2003	**DEQ Response:**
1) Page xiv: Abbreviations, Acronyms and Symbols: "IRU is not defined but is used on Table 4, page 46."	IRU will be added to acronym list.
2) Pages 4 & 5, "The TMDL summary Table B, shows the final decisions as to those streams for which a TMDL will be completed and the pollutant(s) that are the subject of the TMDL. The table does not specifically identify the stream segment to which the TMDL(s) are applied, leaving the public to believe that an entire stream is subject to the TMDL. For example the TMDL for sediment on Jump Creek applies only to that portion from Mule Creek to the Snake River but the table indicates the entire stream fails to meet the sediment standard. Table B should specifically identify the segment(s) of each stream to which the TMDL applies."	The specific stream segment for which TMDL(s) are applied is located in Table C, on page 5.

3) Page 12: "Vegetation: Junipers are also an invasive species. Juniper invasion is a problem to water quality and quantity. The BLM's Owyhee RMP established plans to remove or burn at least 7,500 acres per year or a maximum of 15,000 for the next 20 in its attempts to control this invasion."	Additional narrative will be added regarding juniper encroachment.
4) Page 13: "DEQ's recognition that redband trout have developed a tolerance for the higher water temperatures found in the Owyhee desert is appreciated."	Comment noted.
5) Page 13: "Regarding "The loss of riparian habitat that cools stream temperatures…" as stated in the draft: DEQ does not seem to recognize or distinguish that this loss may not have been as the result of human activity and therefore an action that can be mitigated by human effort. Natural activity such as fire or extreme high flow water events are known causes of alteration of riparian habitat that must be recognized and addressed in the draft."	Additional narrative will be added to address riparian degradation due to extreme high flow events and fire.
6) Page 14, table 2: "Succor Creek: The table indicates that in the segment including headwaters to reservoir there are a variety of fish species present and seems to indicate all species present in the entire defined reach of the stream. We question this and ask that the locations of the various species be more accurately defined in the table."	Table 2 will be modified to better define the locations at which these fish were found.
7) Pages 20 and 64: "Maps show Rabbit Creek and West Rabbit Creek between Reynolds and Sinker Creeks. There is a creek by the same name but not the one DEQ used for their Assessment and TMDL work. The erroneous Rabbit Creek segments should be removed from the two maps."	All of the appropriate figures will be corrected so that only the §303(d) listed Rabbit Creek is shown.
8) Page 21: "The draft indicates the highest elevation in the area as being 6,500 feet which is not correct. The highest elevation in the area is actually more than 8,000 feet."	This error will be corrected.
9) Page 22, "There is an error in the paragraph regarding movement of ground water. As written the paragraph states, "Water on the north side of the Snake River moves in a southwesterly direction to the river and water on the north side moves in a northwesterly direction to the river. The rate of water movement is dependent on hydraulic head, which varies throughout the watershed." The second reference to "north" in the paragraph, which is depicted above in red, is incorrect and should be corrected to read, "south."	This error will be corrected.

10) Page 24, "The second paragraph of the page contains reference to interpretation of a 1997 aerial photo indicating a 20% forest component. That forest component includes mostly Russian Olive and Tamarisk, both of which are listed as noxious weed species in Idaho. The forest component reference should be eliminated or significantly modified to show the true nature of the "forest" component and with an indication that the two species will ultimately become targets of weed eradication programs."	This will be addressed in the narrative.
11) Page 27, "Regarding the reference in the third paragraph to "dewatering effects": Flow alteration is not a pollutant. Agricultural water diversion is as Idaho DEQ has described on page 50. The reference on page 27 should be made correct and consistent with that description."	This sentence will be remove from the document. While the statement is true in terms of how low flows effects pollutant dynamics, it is inconsistent with DEQs current interpretation of flow and habitat alteration.
12) Pages 32, 103, and 104: "Pages make numerous references to the "town of Reynolds." There is no such town. References should be amended to indicate the "community of Reynolds" or simply "Reynolds."	The document will be changed to reflect the comment.
13) Pages 33 and 101: "Figures 1.11 and 2.34: Maps show only Salmon Creek drainage and Reynolds Creek from outlet weir northeast toward the Snake River. Maps should include the entire watershed of Reynolds Creek."	The maps will be modified to show the entire Reynolds Creek drainage.
14) Page 41: "Fourth paragraph refers to "historic placer mining activities contributed large amounts of fine sediments to the creeks and eventually to the Snake River…" While there were some placer mining operations in the area on the Jordan Creek drainage, almost all the mining in the Lower Snake/Succor Creek watershed was from tunneling. There was some gold dredging along the Snake River upriver from the mouth of Squaw Creek."	These clarifications will be made.
15) Page 41: "The last paragraph makes reference to the effects of grazing on soil compaction and fire frequency and notes a cause and effect connection to water quality. As written, the paragraph provides a false picture of the fire situation and leads to an incorrect inference on the effect of grazing to water quality. As written, the paragraph might reflect the nature of the grazing operations in the county up to the 1920's and the period that began the movement that resulted in the Taylor Grazing Act. However, it is not accurate for the 70 year period leading to the present and does not also consider the government's policies of immediate fire	Clarification will be provided about fire frequency and practices prior to the Taylor Grazing Act.

suppression/elimination that continued to the very recent past. The disruption of fire frequency and methods to return to a natural fire regime is currently a major study project of the USDA Agricultural Research Service that is supported by Owyhee County, BLM, and landowners in the watershed. As the final paragraph on this page attempts to provide a brief history of grazing in the area, it should go beyond describing only those historic grazing impacts occurring on the low elevations of the subbasin and not on the area as a whole. The current focus on the low elevation lands where fire frequency has increased to an unnatural cycle unnecessarily focuses on lands that are not the primary focus of the document and is not a particularly relevant exercise for the TMDL. At higher elevations, fire frequency has been exactly the opposite of what is purported by the TMDL. The discussion also errs by implying that livestock grazing was the only cause of changes in plant communities and fire frequency. In addition there have been major changes in grazing use including reduced numbers, controlled season of use and changes in the kind and class of livestock."	
16) Page 42: "The second paragraph indicates, incorrectly, that Swan Falls dam was constructed to supply power to Silver City. It was constructed, as stated correctly in the draft by the Trade Dollar Mining Company, specifically to provide power for the Trade Dollar Mine. Excess power produced by the mine was distributed to Silver City and other mines and camps."	This error will be corrected.
17) Page 42, "Regarding the last paragraph, land ownership. Since 17.2% of the total land of the county is privately owned, we question the accuracy of the statement that 98% of the land in the watershed is publicly owned."	This error will be corrected
18) Page 44, Regarding Table 3: "We question the population numbers presented within the table, in particular the numbers presented for Murphy and Melba. The numbers appear high for Murphy. Regarding the numbers provided for Melba, the numbers presented do not indicate if the 439 residents indicated are those persons with a residence actually located within Owyhee county and a Melba mailing address or those persons who actually reside within Canyon county. In addition, what is encompassed within the "Murphy Division?"	This table is confusing because the Murphy Division represents a large census division. The population numbers will be clarified. The Melba numbers were obtained from the city clerk.
19) Page 44: "The TMDL lists several water resource activities in the subbasin that are	The Snake River Basin Adjudication will be discussed in the TMDL and information regarding

associated with TMDL-related issues. However, there is no mention of the Snake River Basin Adjudication, which will result in a determination of water right ownership. The final determination of ownership could significantly impact potential actions to implement the TMDL and should at the least be mentioned in the TMDL document. This same section contains references to both the Owyhee County Natural Resources Committee (NRC) and the Owyhee Initiative that are incorrect. Regarding the NRC, the draft incorrectly states that it was formed in 2001 to address watershed issues. In reality, the NRC was formed in 1992 to address a variety of natural resource issues and the effects that management of the state and federal lands located within the county have on the custom, culture and economy of the county. Perhaps DEQ intended this reference to be to the Owyhee Watershed Council? That organization is focused on watershed issues. Regarding the reference to the Owyhee Initiative, the draft states, "The Owyhee Initiative, is made up of a diverse membership of ranchers, environmentalists, and growers who are working towards a management plan for the proposed Owyhee wilderness area." That statement is correct in part. The segment highlighted in red print is incorrect and should be changed to read, "…certain federal lands located within Owyhee County."	the water resource activities in the watershed will be corrected.
20) Page 51: "The second paragraph under Temperature on this page should be reduced to the first two sentences. There is no evidence in the subbasin assessment indicating the occurrence of acute high temperatures and nothing to indicate that instantaneous lethal limits are exceeded. Therefore, the description of instantaneous lethal and acute high temperature impacts should be removed. Similarly, Table 7 should not be included in the TMDL. The study information is for coldwater fish in general. By including the table, the TMDL implies that the data are applicable to Redband Trout within this subbasin, which they are not. Absent specific information relative to the cold water species found in this subbasin it is better not to include data that will significantly mislead the public. The discussion in the second paragraph on page 52 verifies that Redband trout are adapted to different temperature regimes than other salmonids or coldwater species in general."	The table will be modified so that time to death is not included. High temperatures do occur in the watershed and this section describes the mechanism of injury/death to fish. There are fish in the watershed, particularly the mainstem, Snake River susceptible to these lethal mechanisms. Narrative in the TMDL clearly states that Redband Trout have adapted to higher temperatures. However, adaptation does not mean that populations are as fit as they would be at a lower temperature nor does it mean that these impacts do not occur to these fish. They do occur, albeit at higher temperatures than other coldwater fish.
21) Pages 86 and 87: "The narrative for the North Fork of Castle Creek on page 86 indicates that the actual flow level of the stream was unknown.	The narrative is intended to indicate that flow measurements were taken but only near the headwaters. Thus, while the headwaters could be

However, Figure 2.24 on page 87 indicates that the temperature data was based on flow rates > 1 cfs. This contradiction needs to be corrected or fully explained."	characterized, a data gap existed for the downstream reaches of the stream. Further, more flow measurements at the headwaters would be desirable to determine when flows are less than 1 cfs.
22) Pages 98 and 99: "Regarding instantaneous BURP data collected on Reynolds Creek: Those flows measured in 1998 are not normal flows at those points. There was a major storm event that caused the high flow at the highway. Usually the creek is entirely diverted except for seepage at the diversions or limited return flows from the fields above the highway. Regarding the reference on page 99 to the percentage of water being diverted (stated at 78%), that reference has also been skewed by the storm event. Without the effect of the storm event, in general almost all water is being diverted except during spring run-off."	DEQ will add additional text to the document indicating that these flow were likely due to a storm event. DEQ agrees that most of the water in the stream is diverted, as noted in the text directly above Table 20. Regarding the reference to 78% of the water being diverted, the statement will be remove from the document.
23) Page 105: "Regarding the paragraph on surface hydrology and beavers: There is a severe beaver problem a short distance above Highway 78 and for some distance below the highway and again above the Nahas Ranch. BLM has recognized the damage done by the beaver in their stream surveys and recommended drastic action to correct the problem associated with the beaver dams. The beaver consume the desirable shading plants, muddy the waters (which increases the solar gain), and burrow into the stream banks causing more erosion. This TMDL needs to include a narrative analysis of the beaver problem in this area."	A narrative section on beavers will be added into the Sinker Creek section.
24) Page 109: "The TMDL should not use any reference to riparian data from the BLM-Owyhee RMP 1999 because the information in that document is highly subjective and much of it is not based on properly conducted evaluations. For example, most BLM reports of PFC are based on evaluations conducted by a single individual rather than by a team of evaluators as specified in BLM's own manuals. Furthermore, the evaluations do not consider stream potential, as in the case of Scotch Bob Creek that is closely paralleled by the main road to Silver City. The determination of whether a stream is satisfactory is solely a subjective judgment because even properly conducted PFC evaluations do not result in a determination of suitability."	DEQ attempts to use information that will assist in the assessment process. PFC surveys along with streambank inventories are used to identify potential areas of excessive erosion. This type of information will be used during the implementation of sediment reductions in Sinker Creek.
25) Page 111: "In the first paragraph of the section regarding Status of Beneficial Uses the sentence regarding dewatering of the creek should show that the de-watered section is below the Nahas Reservoir."	DEQ staff found the stream de-watered below the road crossing at the Nahas ranch.

26) Page 115: "The first paragraph under Surface Hydrology states, "There are relatively few major diversions or other modifications on upper Succor Creek." However, if even one diversion no matter what size results in the dewatering of the stream it should not be passed off as insignificant as the statement implies. DEQ has been made aware of irrigation diversions that do take all of the water from the stream."	The document will be changed to reflect the fact that there are four adjudicated diversions above Succor Creek Reservoir.
27) Page 116: "Regarding table 30, it should be noted and stated in the TMDL that the wide variation in flows that occur from year to year, and even within the year, is the typical water situation for the streams found within Owyhee County."	DEQ agrees and will add a similar statement to the document.
28) Page 117: "Regarding Succor Creek Reservoir, the TMDL should note that active withdrawal of irrigation water creates an unnatural stream below the reservoir."	The document will be changed to reflect this comment.
29) Page 135: "The data in Table 36 should be depicted on a map to make it more identifiable relative to the drainage area involved."	Figure 2.43 will be geo-referenced to that the monitoring segments shown in Table 36 can be readily identified.
30) Pages 138 and 139: "Table 38 should specifically identify (include a map if necessary) the segments of each stream where the TMDL applies. For example, Succor Creek is listed from the headwaters to the Oregon line for temperature and sediment. However, the information on pages 115 to 135 indicate that a number of segments are not impaired and would not be subject to load reduction requirements. The information appears to be entirely inconsistent and should be corrected and or fully explained."	An additional footnote will be added to Table 38 explaining that in many cases the entire segment of a given water body does not require a TDML. The footnote will refer to Chapter 5 (the TDML Section), where the segments requiring TMDLs are located.
31) Page 142: "Under Temperature, the TMDL states that one anthropogenic factor contributing to heat reaching the water is "loss of riparian vegetation (shading)". This wording purports that shading is being lost and the loss is due to human activity. However, this is not necessarily true and generally does not reflect the current situation. In most cases shading is not being lost but is increasing and the true concern is the amount of shading that currently exists not that it is being lost. Secondly, the historic loss of shading cannot be tied directly and solely to human activity. The great winter flood of 1964 virtually eliminated all shrub and tree components on many streams in this subbasin and many of those are still in a recovery stage because of the simultaneous loss of substrate. The narrative also fails to acknowledge that climatic events such as the 1964 floods are natural	Comment noted. Loss of riparian shading is occurring in some cases and it <u>is</u> an anthropogenic factor. In other cases shade is increasing but that is not a factor in heat reaching the water which is what the discussion was focused on. Additional narrative will be added regarding extreme flood events as well as, in the Sinker Creek section, the effect of heavy pressure by beavers.

factors within this subbasin." 32) Pages 149 and 150: "Regarding Temperature, the narrative recognizes that this basin exists in a desert environment that subjects the streams to extreme heat during the late spring and summer months. We agree with and appreciate the establishment of the "best achievable temperature" as the appropriate target value." 33) Page 156: "We have been unable to find where the sediment contribution (or reduction) relative to estimates of lateral recession have accounted for sediment deposition associated with natural stream function. As long as the procedures identify bare bank contributions of sediment and fail to account for deposition, the estimates of change required to achieve sediment standards will be higher than is the actual case. Since the MOS is based on reference conditions of 85% bank stability instead of 80% there is an excessive MOS for in stream channel erosion because there is already a MOS built into lateral recession estimates that do not account for sediment deposition." 34) Various pages including 136, 137, 166, 167: "Various references in the draft refer to the need for collection or verification of data or the validation of proposed methodologies. The draft indicates the intent to commit to a process of adjustment that is intended to provide for changes in approach as new data is acquired, old data is found to be less accurate than previously believed and/or methodologies or models are determined to fall short of predicted accuracy. We appreciate this approach and support it in that we believe that the monitoring and subsequent adjustment of incorrect or incomplete data is a very necessary and critical part of this process."	DEQ acknowledges support of best achievable temperature. DEQ acknowledges that the stream bank erosion inventory method does not readily account for the fluvial transfer of sediment and it's deposition potential. As such, DEQ agrees that there is an additional, unaccounted for, MOS built into the TMDL. However, note that within each stream segment requiring a TMDL, the particle size distribution measurements are performed in riffles, where scouring, not deposition, is expected to occur. Even so, the percentage of fine material (particles <6mm in diameter) in riffles is high (>30%). This indicates that the additional, unaccounted for, MOS due to in-stream fluvial sediment movement does not negate the need for a TMDL. DEQ agrees. Adaptive management will be an important component of the TMDL implementation plan.
Comments From: Elias Jaca, President Chipmunk Grazing Association Received via mail: February 28, 2003	**DEQ Response:**
1) Page 13, paragraph 4, "The loss of desert riparian habitat that cools stream temperatures…Where is the documentation to validate the statements made in this paragraph."	DEQ has shown in the document (Page 167), and the WAG has agreed, that 55% riparian shading represents a preliminary estimate of the riparian potential for Upper Succor Creek. Current conditions range from 13-16% (Table 53). An increase in the surface area of a stream exposed to sunlight leads to an increase in water temperature. This information substantiates that "a loss of riparian vegetation (shading)" increases water temperature.

2) Page 13, paragraph 4, "regarding fisheries data for tributaries in Table 2: We question whether redband trout is a native or introduced species. Idaho Dept. of Fish and Game have repeatedly planted fish at Chipmunk Meadows."	The Federal Clean Water Act and the Idaho Water Quality Standards require the state of Idaho to protect *existing uses* as well as those used designated in the standards. The natural and historic presence of redband trout in the watershed is well documented in scientific literature.
3) Page 14, Table 2, "In the back of the TMDL document reference is made to the data collected regarding fish. There are copies of correspondence between IDEQ and the IDFG. No hard data is shown to document this chart. Historically, information given by the members of Chipmunk Grazing Association states that in thirty five years there have been very few, if any, fish observed from the headwaters of Succor Creek to Granite Creek."	A footnote will be added to Table 2 indicating the method(s) by which the data were collected. In most instances, the data were collected using a backpack electrofisher.
4) Pages 27-40, Regarding Subwatershed Characteristics, "Pertaining to the above pages, DEQ has maps of all of the subwatersheds except for Lower Succor Creek. The lower portion of Succor Creek is included in this TMDL, but is "lumped" together in the watershed. DEQ needs to identify Upper Succor Creek and Lower Succor Creek as different subwatersheds. The data for Upper Succor Creek and the data for Lower Succor Creek should be addressed for each subbasin individually."	An additional map delineating Lower Succor Creek from Upper Succor Creek will be added to the document.
5) Page 41, History and Economics, "The introduction of cattle resulted in…soil compaction." "The change in plant composition resulted in plant composition resulted in a greater frequency of fires in the area." This is not true. Before the Taylor Grazing Act, large numbers of cattle and sheep grazed the rangelands and this reduced the fuel loads that would carry fire. The last paragraph on page 41 states "Grazing has had long-term effects on streams hydrology and vegetation. The introduction of cattle resulted in a decrease of native perennial grasses and an increase in soil compaction because of trampling by concentrated numbers of livestock." There is no reference to the actual facts of this statement. If these statements are to remain in the TMDL they must be documented for credibility."	Additional narrative and references will be added to address this comment.
6) Page 51 Table 7, In regards to the fish mortality study cited in this chart, there is question to the practicality of applying this model to a real stream. This test is done by thermally induced temperatures, similar to a "boiling pot". Streams do not naturally increase in temperature in this same fashion. If Table 7 is included in this TMDL a reference and description of how this experiment	Additional narrative will be added. Also Table 7 will be modified.

was conducted should be included.)	
7) Page 58-59 Date Assessment Methods – It would be beneficial to also use the Proper Functioning Condition (PFC) as an assessment tool. The BLM has reference manuals for this and there is a Standard Stream Riparian PFC Checklist that can be used as another tool for data assessment. In addition, if through this data assessment method a stream is determined to be in proper functioning condition, it may then be beneficial to determine if there is a need for further TMDL development on that stream. PFC would prove to be an additional tool to help in the Stream Bank Erosion Inventory addressed on page 59.	DEQ agrees that the Proper Functioning Condition protocol is a valuable tool and intends to integrate it into the TMDL implementation plan as one option for tracking and documenting management actions. Unfortunately, PFC is not designed calculate sediment loading. As such, it was not used in TMDL development.
8) Page 65- Figure 2.4 July 14, 2002. Fish kill on the Snake River at Walters Ferry. The statements made in the first paragraph in sentences five and six are enough explanation without a picture of this magnitude. The picture is not crucial in making the point. This picture could very well create bias and/or a negative impression. It is recommended to leave the statements in but remove the picture.	The picture is evidence of beneficial use impairment.
9) Page 115, Surface Hydrology—The statement within this paragraph "There are relatively few major diversions or other modifications on Upper Succor Creek." This is an inaccurate statement. There are four major diversions with adjudicated water rights on Upper Succor Creek above the Succor Creek Reservoir.	The document will be changed to reflect the fact that there are four adjudicated diversions above Succor Creek Reservoir.
10) Page 117, Pertaining to bacteria: there are no data available for Upper Succor Creek	Bacteria conditions were not assessed for Upper Succor Creek.
11) Page 117, In reference to Succor Creek Reservoir—The Succor Creek Improvement Co. has drained the reservoir several times to work on the head gate. The Idaho Fish and Game Department shocked the fish as they were draining the reservoir and transplanted them elsewhere.	DEQ will add text to document to reflect the comment. However, this maintenance is not part of the reservoirs normal operational procedure.
12) Page 120, There are no water column sediment data available for Upper Succor Creek	As indicated in the document, this is correct. Water column data is of less utility when bank erosion is the primary source of sediment.
13) Page 123, There is not a numeric value against which TSS conditions in Succor Creek can be compared. Site-specific conditions must be assessed to get accuracy.	This is correct. The Idaho Water Quality Standard for sediment is narrative, meaning there is no numeric value with which to compare results.
14) Page 124, Re. Wolman Pebble Count—there is insufficient hard data to support the "data assessment methods sections describe linkage etc.)	The assessment method is documented in the text on page 124 and in the 'References Cites' section as Wolman (1954). The Wolman (1954) pebble count

	procedure is a well know and often used (by many states) method of determining particle size distribution.
15) Page 125, Paragraph two below Table 33. Regarding the Data Assessment Methods there is no hard data to support the statement "data assessment methods section describe linkage that has been developed between bank stability and fine substrate material."	Other TMDLs developed by DEQ have used similar linkages (see Referenced Cited, DEQ 2001 a,b). Additionally, this TMDL supports the linkage. In segments of Upper Succor Creek where banks were <80% stable, the percentage of fine material (particles <6mm in diameter) exceeded 28%. In segments where banks were >80% stable, the percent fine material was less than 28%.
16) Page 125, regarding temperature the period of collection is questionable due to access and vandalism.	Comment noted.
17) Page 126, There is no data available during the spawning period	Comment noted.
18) Page 129, Figure 2.53 and Figure 2.54, Assumed temperatures are used before 6-6-95 28) Page 132 First paragraph, last four lines- "However, due to insufficient data, the entire critical period for cold water aquatic life cannot be evaluated. Data not available for the period between August 22 and September 21.	To account for the data gap, DEQ assumed that all temperatures prior to the date when data became available were BELOW the criteria, which may not be the case. Even with this assumption, greater than 10% of the data still exceeded the spawning daily average criterion (as shown in Table 35).
19) Page 133, due to insufficient data the entire period cannot be evaluated as necessary for accurate results.	DEQ acknowledges that data for the entire critical period would increase the accuracy of the document.
20) Page 133, During the period of August 22 to September 21 there is no data available and therefore "assumptions" were made. There is also reference on this page to "However, again due to insufficient data…"	Comment noted.
21) Page 133, Actual data collected was from June 19-July 15 and then "assumptions" were again made.	Comment noted.
22) Page 134, In the first paragraph it refers to no data being available above the reservoir and then goes on to explain that because of that DEQ assumes that segment to also exceed the criteria. Assumptions on Upper and Lower Succor Creek being the same should not be made. The statement made in the second paragraph on this page, next to the last sentence, "… a determination is difficult to make due to limited data…"	The assumption being made is that since daily average temperatures in the stream from the headwaters to end of Chipmunk Meadows are above the criterion, it is likely that temperatures from Chipmunk Meadows to above the reservoir are also above the criterion. No comparison is being made to Lower Succor Creek, which extends from the Oregon line to the Snake River.
23) Page 136 Paragraph one, line three ".. DEQ acknowledges there are additional data that would be helpful to increase the accuracy of the analyses. "this in regards to the data gaps. Again it is	The model validation work in Appendix G shows that in fact, the model was quite reliable at calculating the actual stream temperature. DEQ feels that enough data were collected to develop the

questionable whether there is enough basic data to make assumptions or to plug into the models for temperature. In the paragraph right below Table 37, this paragraph addresses that efforts will be made to fill the data gaps, however it is questionable with the amount of data collected whether it validates the TMDL. It is questionable as to how recommendations for TMDL Implementation can be made if more data is needed.	TMDL, but acknowledges that additional data would improve the accuracy of the allocations. It terms of TMDL implementation, the ensuing plan will take an adaptive management approach. This means that progress toward meeting the TMDL goals will be tracked as control measures are implemented. As such, data gaps do not preclude moving forward with implementation.
24) Page 142, Fourth paragraph, third sentence under the Temperature heading "…and a loss of riparian shading.: Is this a substantiated statement and if so, by what source, or is this an assumed statement that there has been a loss of riparian shading. There should be reference data and/or pictures to support his statement or else that portion of the statement should be removed.	The geomorphology of Upper Succor Creek is such that there should be greater than 13-16% shading, which is where the stream lies currently (Table 53). DEQ has shown in the document (Page 167), and the WAG has agreed, that 55% riparian shading represents a preliminary estimate of the riparian potential for Upper Succor Creek. Given that current shading ranges between 13-16%, movement toward the potential is appropriate.
25) Page 153, Monitoring Points—In regards to this paragraph, it is questionable as to whether sufficient data has been collected on Upper Succor Creek to get accurate data from enough segments of the stream to produce recommendations for the TMDL. There is reference at the end of this paragraph that this was due to lack of access to private property. It should be noted there was never any written request to the Chipmunk Grazing Association of which I am a member, for access to these private properties, therefore access was never approved or denied.	DEQ feels that the best available physical, chemical and biological data were used to develop the subbasin assessment and TMDL. DEQ is legally compelled to complete the Mid Snake River/Succor Creek TMDL by December 2002. Given the short time frame, DEQ collected as much additional data as possible to aid in development of the subbasin assessment and TMDL. Regarding access to private properties in Upper Succor Creek, the comment that access was never approved or denied is noted.
26) Page 209, The statement referring to the Mid Snake/Succor Creek subbasin assessment uses the site-specific spawning period for redband trout. The basin specific spawning period is March 1 through June 15. There is not site specific data pertaining to Upper Succor Creek. Readings were taken mostly in June. The critical time stated for spawning is earlier in the year.	The temperature data displayed on pages 127-131 are in fact basin/site specific (to the Mid Snake/Succor Creek basin). However, DEQ agrees that in most cases data were not available for the extent of the spawning period. To account for that data gap, DEQ assumed that all temperatures prior to the date when data became available were BELOW the criteria. Even with this assumption, greater than 10% of the data still exceeded the spawning daily average criterion (as shown in Table 35).
27) Throughout this document there is reference to "lack of data" and due to this lack of data the words "assumptions were made" are used repeatedly. Basing determinations on lack of data or assumptions lacks credibility."	Comment noted.
28) In reference to the chart on page 116, Table 30. Flows in Upper Succor Creek—these flows are not accurate. For thirty-five years the members of Chipmunk Grazing Association have never	It is DEQ's belief that the flows shown in Table 30 are accurate. The flows were determined following the standard set-interval method using a calibrated Marsh-McBirney flow meter. The documentation

witnessed these excessive flows at that time of year. Where is the documentation to support this chart?	to support this chart is located in the Boise Regional Office files
Comments From: Richard and Connie Brandau Wilson ID Received via fax: February 28, 2003	**DEQ Response:**
1) xiv, The acronym IPC is used as a reference, please include it at xiv: Abbreviation, Acronyms, and Symbols. 2) Page 10, paragraph 3, Pertaining to climate --- The statement that the "closest climate station... is located in Boise" and "the climate in Boise is also semi-arid and thus, relatively similar" is totally ludicrous. This DEQ assessment staff chose to use the climatic gauging station information from Western Regional Climate Center at http://www.wrcc.dri.edu/climsum.html (page 248) when there are two weather reporting stations located within the boundaries of this watershed, one near Oreana and one at Reynolds Valley. One phone call resulted in the following information: In response to your request about data availability at the Reynolds Creek Experimental Watershed: We recently published a data summary in Water Resources Research (2001, volume 37, pages 2817-2861) that describes the watershed data collection efforts and data that is available over the web at our anonymous ftp site (ftp.nwrc.ars.usda.gov in the directory "databases/rcew"). We can also put the entire database on a CD for anyone that does not have web access. This site does not contain all of the data that we collect and only covers 1962 to 1996. We are planning to update the on-line database in the next year or so. In the mean time, we can provide more recent data in response to individual requests. Our precipitation network is the most extensive. We have collected continuous precipitation data since 1962 from 12 sites and records of various lengths for an additional 41 sites. We are currently monitoring about 28 precipitation sites and have been upgrading all of these to full meteorological status (wind speed and direction, relative humidity, air temperature, solar radiation etc.). We also collect meteorological data at 4 sites out in the Snake River Plain, two sites in the Boise foothills and at one of our remote field locations near Denio, NV. We are hoping to deploy an additional 6 met sites out in the South Mountain area of Owyhee County in conjunction with our Juniper hydrology project. Just let us know if you need any specific data. Thanks....	IPC (Idaho Power Company) will be added as an abbreviation The statement on Page 10, paragraph 3 says "The closest climate station **that gives percent possible sunshine** is located in Boise, which is the adjoining watershed." The Reynolds Creek Experimental Station or any of the other local weather stations do not provide percent sunshine. The paragraph goes on to say "The **climate** in Boise is also semi-arid and thus, relatively similar. This is a true statement. Factors such as the movement of air masses across pressure ridges, the proximity of an area to the ocean, and the angle of the sun at certain times of year dictate a region's climate. Owyhee County and Ada/Canyon Counties are certainly in the same region and thus, have the same climate. Having said that, DEQ acknowledges that the Mid Snake River/Succor Creek basin and the Boise area often do not have the same weather. Weather is described as daily or seasonal fluctuations in temperature, precipitation and winds. For purposes of populating the SSTEMP temperature model, DEQ always used data from the nearest weather station that provided the necessary data.

(copy of letter attached)	
2) With such a wealth of onsite information at hand why use climate data from outside (Boise and Grand View) the watershed?	See above comment. Grandview is within the watershed.
3) Page 21, paragraph 1, Topography Please explain the statement and define terminology "overall relief ratio - is 0.02"	This term will be removed from the document.
4) Page 21, paragraph 1, The general characterization that all of the streams in the watershed flow north is false and presents a basis for discounting the "azimuth" related conditions which definitely affect the temperature of east/west streams flowing through narrow basalt canyons: ie: Castle Creek, Sinker Creek, Upper Succor Creek,.	DEQ acknowledges the comment and will remove the word "north" from the sentence. Regarding the use of azimuth in the SSTEMP temperature model, the stream-segment specific azimuth was always used. Thus, the effect of sun angle on stream temperature is accounted for.
5) Page 21, paragraph 2, The statement "The highest elevation of 6,500 feet is found in the Silver City Range bounding the southern edge of the watershed" shows lack of attention to detail. A higher elevation is on Squaw Butte, located near the heart of the watershed, which is 6,740 feet. Three subbasin watersheds form off of the immediate peak of Squaw Butte (McBride, Squaw, and Cottonwood) and within one mile of the Butte are the basin heads of Hardtrigger and the Reynolds Creek tributaries of Salmon, Fart, Cottle and Macks Creeks.	This correction will be made.
6) Pages 29 through 40 Maps: The TMDL Report Glossary defines STREAM in part as "a natural water course containing flowing water, at least part of the year." Yet the maps include dry sand washes and gulleys under the Legend as streams. If I were to use this as a reference I would expect to be able to go to those "streams" shown on the maps and find water. At sometime in the future will this be used as a reference to "historically watered areas"? I would suggest removal of the normally dry wash and gulley locations or perhaps reference them differently in the map legends because they definitely DO NOT "normally support communities of plants and animals within the channel and the riparian vegetation zone."	DEQ agrees with the comment. Additional clarification will be made on the legends of each map.
Page 41 1.3 Cultural Characteristics	
7) Page 41, paragraph 5, If you would delve a little deeper into the history of Owyhee County you would find that the inference to placer mining in the creeks of the Succor Creek Subbasin actually took place on the streams flowing into the Owyhee River. None of the "north slope" creeks	These corrections will be made.

we are dealing with in this document ever yielded up gold or silver. The statement that "Mining sources were nearly depleted by the late 1800s" is made in error. Mining continued to prosper well into the 1900's and the mines still come back into production when gold prices rise above a certain level.	
8) Page 41, paragraph 6, The paragraph on cattle a sheep grazing reflects that "by 1869 there were several thousand head of cattle in Owyhee County." The Owyhee County, Idaho "Blue Book" published in 1898 on page 13 states " In 1882 the number of cattle assessed in the county was 24,559" and " in 1885 it was estimated that there were over 60,000 head of cattle within the confines of Owyhee County" and also " in 1888-9 the cattle interest in the county reached their maximum and there was at that date over 100,000 head of cattle in the county". It then states that due to severe conditions "the cattle trade gradually shrank to its present condition, there not being over 15,000 head in the county" but "the sheep industry has risen to - over 150,000 head."	Corrections will be made in TMDL.
9) Page 41 & 42, It would lend more credibility to this document to correct some of the statements pertaining to the history and economics. Also some of the remarks to fire frequency in relation to plant composition need to either be referenced or if a matter of opinion - deleted.	References will be added.
10) Page 42, paragraph 1, Irrigated agriculture in the Succor Creek Subbasins dates back, not to the 1880's, but prior to the 1860's. Five SRBA water rights in Reynolds Creek Basin 57-R alone have priority dates of June 1, 1864.	Correction will be made.
11) Page 42, paragraph 2, As Swan Falls is closer to Murphy than it is to Kuna I would suggest this paragraph begin "Located between Kuna and Murphy, at river mile" etc.	Clarification will be made.
12) Page 42, paragraph 3, The first sentence of paragraph three makes more sense if it is included with the information in Paragraph 4, while the second sentence takes on more meaning when included within the context of Paragraph 5. Rather than saying the watershed is "sparsely populated" (by whose definition) this paragraph would make more sense reading something like: Ninety-eight percent of the land in the watershed is publicly owned creating a wide dispersal of the population on the remaining two percent of privately owned land. The primary economic activities of the more populated privately owned	Comment noted: will incorporate parts of suggested wording.

land areas consist of farming, ranching, livestock production, dairies, and related agricultural industries. The economic activities are the supporting structure/base for the towns and communities of Oreana, Murphy, Reynolds, Guffy, Wilson, Givens, Marsing and Homedale and their businesses, located within the Succor Creek Subbasin.	
13) Page 42, Paragraph 4, Please include as crops that are farmed: alfalfa hay, grass hay and pasture. These you state later in the document are the main crops in some areas.	These crops will be included.
14) Page 44, Table 3, Mid Snake River/Succor Creek Watershed Demographics: I highly doubt that any census will confirm the numbers used for the population of Murphy under the Town listing. At least be consistent in the listings; don't use "Murphy Division" without explaining what the difference in meaning is. According to the Owyhee County Clerk Charlotte Sherburn, the "population of Murphy varies between 70 and 80" with 77 currently listed on the water billings. Quite a difference from the 1,512 this Draft lists as the 2000 population.	The census information is confusing because the Murphy Division is a census division not actual town population. This section will be rewritten to provide clarification.
15) Page 44, Paragraph 1, Swan Falls dam is better described as located between Kuna and Murphy (as it is closer to Murphy than it is to Kuna)	Clarification will be made.
16) Page 44, Paragraph 3, The Owyhee Natural Resource Committee was formed prior to 1994, originally as the Owyhee County Natural Resource Planning Committee. Its name was changed by the Owyhee County Board of Commissioners in 2001 to Owyhee Natural Resource Committee to avoid being confused with the Owyhee County Planning and Zoning Commission. The purpose of the committee is to keep the Board of County Commissioners informed and advised of any and all issues related to the natural resources issues within Owyhee County, and which may include TMDL related issues. You may contact the Director of the Owyhee County Natural Resource Committee (Jim Desmond) for verification of these facts.	Corrections will be made.
17) Page 44, paragraph 5, The reference to the Owyhee Initiative group and the statements made in this draft document should be verified with the Chairman of that group before these assumptions are committed to print. It is presumptuous of DEQ to make statements as to the focus and goals of this group whose actions will be dictated by the	This statement will be rewritten.

passage of (as yet unproposed) legislation.	
18) Page 45, Tables 4 & 5, The footnotes under both Table 4 and Table 5 "refers to a list created in 1998". Please explain how streams came to be on this list that was created, and by whom.	This information will be added to the footnotes.
19) Page 46, 48, 82, and 249, "Attainability" is briefly mentioned on these pages. Has a "detailed evaluation of the attainability of uses" been done for streams in this watershed? If so where is that information located. Page 82, Will "use attainability analysis" be included as a part of the implementation stage or should it have been addressed in this, the assessment stage?	An evaluation of the attainable uses has not been performed for the streams in the Mid Snake/Succor Creek watershed. All practical control measures must be put into place before the Federal Clean Water Act allows beneficial uses to be changes. That is not the case in this watershed. Preferably, and if warranted, as may be the case with Castle Creek, a use attainability analysis is performed prior to the assessment stage. DEQ is in the process of determining whether a UAA is warranted for Castle Creek.
20) Page 51, Table 7, Please take the time to explain in detail the method of heating the water that resulted in the "thermally induced coldwater fish mortality. It is my understanding that this is the infamous "boiling pot" method whereby water is artificially heated from the bottom up. Streams (other than those with geothermal water sources) do not heat from the bottom up, but rather are heated by solar radiation from the top down, with cooler water pooling at the bottom. Using the Oregon DEQ 2002 mode of thermally induced mortality is about as comparative as making sun tea versus boiling up a strong pot of the hot English brew.	Additional narrative will be added to explain the study methods.
21) Page 65, Figure 2.4, Please move the fish kill photo to its appropriate location immediately below Temperature, between Paragraph 1 and Paragraph 2. It can and will be viewed out of context in any but its appropriate location. This photo may have more negative and/or detrimental impacts than are warranted by its inclusion in this document.	The photo will be moved to the suggested location.
22) Page 87, Table 2.24, Even though the Mid Snake River and its surrounding watersheds are part of the most active geothermal areas in the state of Idaho, this TMDL does not address the effect of geothermal activity on water temperature. Hot wells, both artesian and pumped, abound in this watershed. There is extensive data pertaining to geothermal activity available at IDWR. Underground springs provide a continual source of thermal heating in the Snake River in the Wilson area. Visual evidence of thermal activity can be observed any cold morning by simply looking for an exceptional amount of steam rising from the	Thermal activity will be addressed as part of the thermal site potential study of the Snake River. Geothermal heating is being investigated as part of the temperature study on Castle Creek.

water body, be it the river, creek, spring or well. Temperature in relation to geothermal heating needs to be addressed where appropriate.	
23) Page 151, these conclusions were drawn using empirical derived characteristics and concepts. There are numerous statements of "no available data" "insignificant data", "assumptions" "is difficult to determine due to limited data" scattered through this document. The terms "EMPERICAL characteristics" and "EMPIRICALLY derived" are used. Please include the definition of "empiric" and/or "empirical" in the glossary. The New World Dictionary of the American Language Second College Addition defines them as: empiric em.pir.ic 1. a person who relies solely on practical experience rather than on scientific principles 2. (Archaic) a practitioner without proper qualifications and regular training; charlatin; quack empirical em.pir.i.cal 1. relying or based solely on experiment and observation rather than theory (the empirical method) 2. relying or based on practical experience without reference to scientific principles (an empirical remedy) empiricism em.pir.i.cism 1. experimental method; search for knowledge by observation and experiment 2.a) a disregarding of scientific methods and relying solely on experience b) quackery 3. the theory that experience is the only source of knowledge	The word "empirical" will be added to the glossary. It is important to understand the context in which the word empirical is used on page 151. The sentence says, "This sediment analysis characterizes sediment loads using average or seasonal rates determined from **empirical characteristics that developed over time within the influence of peak and base flow conditions.**" The sediment loads are calculated mathematically, but the characterictis that cause those loads are empirically derived due to flow conditions. In other words, nature is empirical. DEQ uses mathematics to describe nature.
24) Page 227, Appendix Photographs, I think that it would be appropriate to include the photographs provided to DEQ of the Upper Succor Creek reach (from Horse Thief upstream to Big Cottonwood) that were taken on October 19, 2003. I have the originals and the negatives if they are required.	Two of the photographs provided to DEQ will be inserted into the document to help describe flows in Upper Succor Creek.
25) Page 271, Appendix I. SSTEMP Model Inputs and Outputs - Model Run Sheets, There is an extensive amount of data available from the Agricultural Research Service by which the accuracy of the SSTEMP Model used for this TMDL can be checked. The proofing would be very beneficial, especially in face of the fact that ALL of the base meteorological information	There are 152 weather stations for Idaho on the Western Regional Climate Center web site. One of the stations is located in Reynolds. The link is: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?idreyn The Reynolds data was used to populate nearly all of the meteorological information for SSTEMP (Succor Creek). Data from Boise was only used when local data were not available. Additionally,

plugged into the SSTEMP Model is taken from a source located over 50 miles from, and thousands of feet in elevation below, the site on Succor Creek (does this also apply to Diamond Creek?).	the data were corrected for elevation where applicable.
<u>Reynolds Creek</u>	
26) Page 21, Paragraph 2 , The statement "The highest elevation of 6,500 feet is found in the Silver City Range Bounding the southern edge of the watershed" shows lack of attention to detail. One location with a higher elevation is Squaw Butte, located near the heart of the watershed, which is 6,740 feet. Three subbasin watersheds form off of the immediate peak of Squaw Butte (McBride, Squaw, and Cottonwood) and within one mile of the Butte are the basin heads of Hardtrigger and the Reynolds Creek tributaries of Salmon, Fart, Cottle and Macks Creeks.	This correction will be made.
27) Page 99, The statement "The 1998 BURP notes indicate that on July 1, 1998, approximately 75% of the water was being diverted" is incorrect and implies a condition/situation that did not exist. The Reynolds Creek Watermaster's diary attachment CB1) notes that on July 2, 1998 there is about 200 inches (4.00 cfs) of water going past the last ditch diversion" That amounted to 2% of the 8,252 inches (41.26 cfs) that was being diverted/used for irrigation (attachment CB2). So 98% of the waters of Reynolds Creek were being diverted for irrigation, NOT 75 % as stated. The only reason that water was going past Highway 78 at that point was because on 6/24/95 the immediate area received approximately .75" of rainfall, creating high water which took out some of the diversion dams. By July 8th the diversion dams had been repaired and/or replaced and all of the adjudicated waters of Reynolds Creek were again being diverted. As noted by the watermasters diary for 1998 this was an extraordinary year for rainfall and late water. For verification this information including the water measurement for June/July 1995 is part of the permanent records of the Idaho Department of Water Resources-Western Region. Please correct the original statement to reflect more accurately the conditions at that time, 1995. The correction may help to avoid future false assumptions that there is normally excess water available during that time of year.	This statement will be removed from the document.
28) Page 99, Table 20, An additional footnote (2) should indicate that Brandau Farms 1.57 cfs is also included in the combined R.I.D. Lateral (Bernard Ditch) 17.24 cfs (it can be diverted at either location). I don't know if it would be appropriate	An additional footnote will be added to Table 20 reflecting this information.

at this point, or time, to acknowledge or address the "high flow" water rights as recognized in the Snake River Basin Adjudication.	
29) It may be of value to note that during the March 15 to November 15 irrigation season, the total Snake River Basin Adjudication decreed water rights for Reynolds Creek Basin total 104.56 cfs.	This information will be added to the document for informational purposes only.
30) Page 99, Table 21, For future reference it might be beneficial to also include an additional table listing the highest flow events chronologically. This would clearly show that some of the highest events occurred within the same season and also emphasize the extreme variation in timing and volume of runoff from year to year: 01-31-63 2,331 12-23-64 3,850 01-28-65 1,113 06-11-65 1,113 01-21-69 899 01-27-70 728 03-02-72 667 06-11-77 1,119 01-11-79 1.662 02-25-82 2,082 04-11-82 861	DEQ agrees. Table 21 will be changed to show the flow events chronologically.
31) I would like to complement the staff at IDEQ on doing a good job given the limited time and funding parameters they had to work within. Personally we had three years of professionally collected data to offer, historical anecdotes from Henry Brandau a lifetime resident on Reynolds Creek, and a wealth of photographic documentation of "events" on Reynolds Creek. Thank you for analyzing and utilizing that information pertaining to the Reynolds and Hardtrigger Creek portions of this Draft TMDL.	Comment noted.
32) One suggestion I would offer to DEQ in establishing future Watershed Advisory Groups would be to contact property owners within the watershed at the onset. It is much more productive for DEQ if landowners can be informed and included from the onset than it is to try to placate at the end of a process. This could be done by way of an informative letter at the beginning of the TMDL process, letting them know what type of data or information would be most beneficial to them and/or DEQ and could perhaps include an access agreement. You know your job best and need to inform stakeholders of what your job is. Your job will become more effective by utilizing	DEQ agrees and intends to do so in upcoming TMDLs.

the wealth of information that can be provided by those who live with the land and the water on an intimate, everyday basis.	
Comments From: A compilation of comments from: Craig Baker, Richard Brandau, Connie Brandau, John Cossel, Kent Frisch, Mark Frost, Ted Gammett, Winston Gammett, Jerry Hoagland, Elias Jaca, Inez Jaca, Duane LaFayette, Gwen Miller, Paul Nettleton, William H. Parker, Brenda Richards, Robert Thomas. Submitted by Connie Brandau Received via fax: February 28, 2003	**DEQ Response:**
1) These comments are not intended to denigrate the efforts of the DEQ staffers who put the Draft TMDL document together. We applaud their efforts given the time and funding constraints under which they labored. These comments are made to address (and hopefully correct) the more obvious areas of inadequacy and factual error, which as drafted make this document unable to stand the test of accuracy.	Comment noted.
Some of the inaccurate information may be of a minor issue, but serves to show the unfamiliarity of the authors with even the basic historic, cultural and economic issues of the area. Accuracy lends credibility. When this document cannot supply even credible basic background information, the limited amount of data upon which the conclusions of this document are based, become extremely questionable. For the sake of future reference by whomever uses this document we point out/emphasize that this is the first stage of an extremely long term and continually ongoing planning process. The goals can only be met through continued cooperation and communication, by establishing uniform monitoring practices and guidelines, and continually updating that information/data in an understandable productive way.	Comment noted
The staff has done a good job considering the fact that they have limited resources, personnel and time in which to accomplish the task at hand.	Comment noted
I would like to state that I realize the need for this process, I'm only a little disappointed in the seemingly incompleteness of the finished product.	Comment noted
We would like to thank the members of the WAG and DEQ for all the time and effort that went toward the completion of this Subbasin Assessment. After reviewing the Mid	Comment noted

Snake/Succor Creek Sub-basin Assessment and TMDL, we feel it was a good Assessment and TMDL, but we do have a few concerns and recommendations.	
2) Page xiv, Abbreviations, Acronyms, and Symbols, IRU is not defined, but used on Table 4, page 46	IRU will be added to the Abbreviations, Acronyms, and Symbols list.
3) Pages 6 - 44, When describing the watershed characteristics, there is no mention of the effects that wildlife may have in respect to water quality issues. Please be sure to note that concentrations of wildlife such as elk and wild horses may have negative effects on riparian areas, thus effecting water quality.	A discussion of BLM's management objectives for wild horse populations will be integrated into the subbasin assessment.
4) Page 10, paragraph 3, Pertaining to climate --- The statement that the "closest climate station... is located in Boise" and "the climate in Boise is also semi-arid and thus, relatively similar" is totally ludicrous. There are two weather stations located within the boundaries of this watershed, one near Oreana and one at Reynolds Valley. One phone call resulted in the following: In response to your request about data availability at the Reynolds Creek Experimental Watershed: We recently published a data summary in Water Resources Research (2001, volume 37, pages 2817-2861) that describes the watershed data collection efforts and data that is available over the web at our anonymous ftp site (ftp.nwrc.ars.usda.gov in the directory "databases/rcew"). We can also put the entire database on a CD for anyone that does not have web access. This site does not contain all of the data that we collect and only covers 1962 to 1996. We are planning to update the on-line database in the next year or so. In the mean time, we can provide more recent data in response to individual requests. Our precipitation network is the most extensive. We have collected continuous precipitation data since 1962 from 12 sites and records of various lengths for an additional 41 sites. We are currently monitoring about 28 precipitation sites and have been upgrading all of these to full meteorological status (wind speed and direction, relative humidity, air temperature, solar radiation etc.). We also collect meteorological data at 4 sites out in the Snake River Plain, two sites in the Boise foothills and at one of our remote field locations near Denio, NV. We are hoping to deploy an additional 6 met sites out in the South Mountain area of Owyhee County in conjunction with our Juniper hydrology project. Just let us know if you need any specific data. Thanks.... (copy of letter attached)	The statement on Page 10, paragraph 3 says, "The closest climate station **that gives percent possible sunshine** is located in Boise, which is the adjoining watershed." The Reynolds Creek Experimental Station or any of the other local weather stations do not provide percent sunshine. The paragraph goes on to say "The **climate** in Boise is also semi-arid and thus, relatively similar. This is a true statement. Factors such as the movement of air masses across pressure ridges, the proximity of an area to the ocean, and the angle of the sun at certain times of year dictate a region's climate. Owyhee County and Ada/Canyon Counties are certainly in the same region and thus, have the same climate. Having said that, DEQ acknowledges that the Mid Snake River/Succor Creek basin and the Boise area often do not have the same weather. Weather is described as daily or seasonal fluctuations in temperature, perception and winds. For purposes of populating the SSTEMP temperature model, DEQ always used data from the nearest weather station that provided the necessary data.

5) With such a wealth of onsite information at hand why use climate data from outside (Boise and Grand View) the watershed?	Local data were used where possible. See response above.
6) Page 10 "Closest weather station" The closest weather station to Grand View and Oreana is located south of Grand View and is operated by the US Bureau of Reclamation. http://mac1.pn.usbr.gov/agrimet	See DEQ response above, comment #4
7) Page 10, Reference to "the climate is Boise is also semi-arid and thus, relatively similar." I live in Oreana, situated just off highway 78 between Murphy and Grand View. Using the rainfall figure 1.1, the difference between Boise and Grand View is an astonishing 60%. Listening to the weather reports on Boise television and radio, I've become aware of differences in even which direction our storm fronts approach.	DEQ agrees that weather patterns are different. However, the climates are the same. See DEQ response above, comment #4.
8) Page 12, Vegetation, Junipers are also an invasive species. Juniper invasion is a problem to water quality and quantity. The BLM-ORMP plans to remove or burn at least 7,500 acres per year or a maximum of 15,000 for the 20 years just to maintain control of their invasion.	Narrative about juniper encroachment will be added.
9) Page 13, DEQ's recognition that redband trout have developed a tolerance for higher water temperatures found in the Owyhee desert is appreciated.	Comment noted.
10) Page 13, The loss of riparian habitat that cools steam temperatures... the loss may not have been anthropogenic, but natural as in fire or extreme high flow events.	DEQ agrees that at times the loss of riparian habitat may be due to fire or extreme high flow events. However, the loss of riparian area, regardless of how it happens, will contribute to the heating of water.
11) Page 13, 14, 178 Concerning redband trout. The DEQ needs to be aware that reference material used in this document, concerning redband trout, Allen D.B., B.J. Flatter and K. Fite 1995 and 1997, were collected and complied in part by an individual who has since been involved in lawsuits to remove livestock grazing entirely from the Western landscape, namely Katie Fite. You may think that this is a frivolous statement but I assure it is not. It has cost hundreds of thousands of dollars in court costs which could have been spent much more productively on improvement on the land and to the water itself. The groups that she belongs to (Land and Water Fund of the Rockies, Idaho Watersheds Project, Northwest Watersheds Project, and Idaho's Committee for High Desert) have continually brought suit against individuals,	The person to whom you are referring was an employee of IDFG at the time the data were collected. Additionally, the primary author (Allen) and the secondary author (Flatter) remain IDFG employees. The sole intent of the referenced studies was to collect fish distribution and abundance data.

groups and government agencies. These lawsuits reference 303(d) listings most of which have proven to be unfounded. These groups will continue their frivolous harassment, using any means available. This is why it is mandatory that the data and information used in TMDL assessments be true, defensible and of the highest quality.	
12) Page 14, Table 2, Succor Creek (headwaters to Reservoir) Are all those different fish present? Or, are they only in the Reservoir? Needs clarification.	Table 14 will be clarified to better delineate where the fish were located.
13) Page 20 and 64, Maps show Rabbit Creek and West Rabbit Creek between Reynolds and Sinker Creek. There is a creek by the same name, but not the one DEQ did their Assessment and TMDL on. Those Rabbit Creek names should be removed from these two maps.	All of the appropriate figures will be corrected so that only the §303(d) listed Rabbit Creek is shown.
14) Page 21, paragraph 1, Topography Please explain the statement and define what "overall relief ratio - is 0.02"	This term refers to overall watershed slope is being removed because it is confusing and does not have much bearing on a subwatershed basis.
15) Page 21, paragraph 1, The general characterization that all of the streams in the watershed flow north is false and presents a basis for discounting the "azimuth" related conditions which definitely affect the temperature of east/west streams flowing through narrow basalt canyons: ei: Castle Creek, Sinker Creek, Upper Succor Creek,.	DEQ acknowledges the comment and will remove the word “north” from the sentence. Regarding the use of azimuth in the SSTEMP temperature model, the stream-segment specific azimuth was always used. Thus, the effect of sun angle on stream temperature is accounted for.
16) Page 21, paragraph 2, The statement "The highest elevation of 6,500 feet is found in the Silver City Range Bounding the southern edge of the watershed" shows lack of attention to detail. A higher elevation is on Squaw Butte, located near the heart of the watershed, which is 6,740 feet. Three subbasin watersheds form off of the immediate peak of Squaw Butte (McBride, Squaw, and Cottonwood) and within one mile of the Butte are the basin heads of Hardtrigger and the Reynolds Creek tributaries of Salmon, Fart, Cottle and Macks Creeks.	This correction will be made.
17) Page 21, The highest elevation is more than 8,000 feet. Not 6,500 feet.	This correction will be made.
18) Page 22, The movement of ground water... and water on the <u>south</u> side moves in a northwesterly direction to the river. Not north side.	This correction will be made.
19) Page 24, A 1997 aerial photograph	Additional narrative will be added for clarification

interpretation... vegetation was 20% forest. That forest includes mostly Russian olive and tamarisk, both invasive species and listed as noxious weeds in Idaho.	
20) Page 27, De-watering affects... flow alteration is not a pollutant. Agricultural water diversion is as Idaho DEQ has described on page 50.	This sentence will be remove from the document. While the statement is true in terms of how low flows effects pollutant dynamics, it is inconsistent with DEQs current interpretation of flow and habitat alteration.
21) Page 27, Toy Mountain is more than 8,000 feet elevation.	A correction will be made to clarify at what elevation Castle creek begins.
22) Pages 27-40 Subwatershed Characteristics In this section DEQ has maps of all of the subwatersheds EXCEPT LOWER SUCCOR CREEK. If the lower reach is included in this TMDL it should be identified and defined as clearly as the other subbasins. If DEQ is identifying Upper Succor Creek and Lower Succor Creek (which are further segmented for purposes of this TMDL by flowing out of Idaho - the upper reach - and into Oregon before coming back in to Idaho - the lower reach) then it is my opinion as a member of this WAG that the data for the Upper and Lower Succor Creek reaches should be treated and addressed as any other separate subbasin is.	An additional map delineating Lower Succor Creek from Upper Succor Creek will be added to the document.
23) Page 27, I would like to reference page 27 in the draft proposal; Sub watershed Characteristics first paragraph, first sentence, "...almost 75% of total stream lengths are classified as intermittent (Montana State University, 2002). I referenced the link on page 183 in the attempt to find the exact names and locations of the "75%" of streams and after an extensive search of the site could not locate any type of list or criteria for this type of listing at all. I feel it is imperative to be able to look up the data that is being quoted as a determining factor.	DEQ apologizes for the fact that the website no longer has a current link to that data and will correct that reference.
24) Pages 29 through 40 Maps, The TMDL Report Glossary defines STREAM in part as "a natural water course containing flowing water, at least part of the year." Yet the maps include dry sand washes and gulleys under the Legend as streams. If I were to use this as a reference I would expect to be able to go to those "streams" shown on the maps and find water. At sometime in the future will this be used as a reference to "historically watered areas"? I would suggest removal of the normally dry wash and gulley locations or perhaps reference them differently in the map legends because they definitely DO NOT "normally support communities of plants and	DEQ agrees with the comment. Additional clarification will be made on the legends of each map.

animals within the channel and the riparian vegetation zone."	
25) Page 32 & 103 & 104, "... the town of Reynolds is located in this valley." "Surveys performed in 1997... above the town of Reynolds." "1995 data collected near the town of Reynolds." There is no "town of Reynolds". I suggest just Reynolds, or community of Reynolds.	The document will be changed to reflect the comment.
26) Page 33 & 101, Figure 1.11 & 2.34, Maps show only Salmon Creek drainage and Reynolds Creek from outlet weir northeast toward the Snake River. Maps should include entire watershed of Reynolds Creek.	The maps will be modified to show the entire Reynolds Creek drainage.
27) Page 35, Sinker Creek originates at over 8,000 feet elevation.	This correction will be made.
28) Page 35, 105 & 270, DEQ should have reached the conclusion in this listed section (SINKER CREEK) that temperature standards and sediment/bank stability goals are unattainable unless beaver activity is controlled. The total listed reach of Sinker Creek is only a human controlled conveyance for irrigation and has not been a natural stream ever since the construction of the dam more than 25 years ago. Flow rates are strictly controlled by releases from the dam. Therefore the erosion rates inventoried on page 270 are inaccurate and irrelevant because there are no naturally occurring high lows that would cause such erosion except the occasional infrequent desert cloudburst in the dry gullies THAT ENTER THE SYSTEM below the dam. The only other possible erosion source is the washout of abandoned beaver dams. DEQ definitely needs to reexamine its old data, collect new data, and revisit its conclusions on Sinker Creek.	Additional narrative on beavers will be added. DEQ inventories only actively eroding sections of the stream that would be affected by the high flows that occur presently. DEQ found that the banks are in relatively good shape as evidenced by the small reduction in bank erosion necessary to meet the requirements of the sediment TMDL (8%). There are areas of banks where there is slumping, sloughing, and these areas deliver sediment directly into the creek. Also, water does periodically go over the dam, evidence that high flows do occur. The Sinker Creek system does have its own high/lows albeit not to as great an extent as it had before becoming a regulated system.
29) Page 35 & 105, On page 35 and page 105 the draft assessment says that the stream (SINKER) is dewatered below the diversion for Nahas Reservoir. In actuality it is also frequently dewatered through a section of the old Tyson Ranch which is currently called the Edwards Ranch. Twice in my tenure here I have seen it bone dry at the Nahas diversion in August and most every year it falls below 1 cfs for periods in the month of August	Comment noted. This information will be incorporated into the TMDL.
30) Page 41, History and Economics, "historic placer mining activities contributed large amounts of sediment to the creeks and eventually to the Snake River." There may have been some placer mining in the Jordan Creek drainage. Almost all the mining in this Lower Snake River/Succor	This correction will be made.

Creek watershed was from tunneling. There was some gold dredging along the Snake River up the river from the mouth of Squaw Creek.	
31) Page 41, "The introduction of cattle resulted... soil compaction," Where? "The change in plant composition resulted in the greater frequency of fires in the area." No. Prior to the Taylor Grazing Act, large numbers of cattle and sheep grazed the rangelands eliminating any fuels to carry a fire. The traditional natural fire frequency was stopped. Junipers are very intolerant of heat and thrived in the areas not burned by the natural fire frequency. We are working with USDA Agricultural Research Service to research fire effects and to restore fire frequency as a natural control of juniper, landscape, and to improve water quality and quantity.	Narrative on the Taylor Grazing Act will be incorporated, references added and the frequency of fire information clarified and corrected.
32) Page 41, paragraph 5, If you would delve a little deeper into the history of Owyhee County you would find that the inference to placer mining in the creeks of the Succor Creek Subbasin actually took place on the streams flowing into the Owyhee River. None of the "north slope" creeks we are dealing with in this document ever yielded up gold or silver. The statement that "Mining sources were nearly depleted by the late 1800s" is made in error. Mining continued to prosper well into the 1900's and the mines still come back into production when gold prices rise above a certain level.	Correction will be made.
33) Page 41, paragraph 6, The paragraph on cattle a sheep grazing reflects that "by 1869 there were several thousand head of cattle in Owyhee County." The Owyhee County, Idaho "Blue Book" published in 1898 on page 13 states " In 1882 the number of cattle assessed in the county was 24,559" and " in 1885 it was estimated that there were over 60,000 head of cattle within the confines of Owyhee County" and also " in 1888-9 the cattle interest in the county reached their maximum and there was at that date over 100,000 head of cattle in the county". It then states that due to severe conditions "the cattle trade gradually shrank to its present condition, there not being over 15,000 head in the county" but "the sheep industry has risen to - over 150,000 head."	Information will be added into TMDL. This correction will be made.
34) Page 41 & 42, It would lend more credibility to this document to correct some of the statements pertaining to the history and economics. Also some of the remarks to fire frequency in relation to plant composition need to either be referenced or if a matter of opinion - deleted.	Corrections will be made and references added.

35) Page 42, paragraph 1, Irrigated agriculture in the Succor Creek Subbasins dates back, not to the 1880's, but prior to the 1860's. Five SRBA water rights in Reynolds Creek Basin 57-R alone have priority dates of June 1, 1864.	Correction will be made.
36) Page 42, paragraph 2, As Swan Falls is closer to Murphy than it is to Kuna I would suggest this paragraph begin "Located between Kuna and Murphy, at river mile" etc.	Clarification will be made.
37) Page 42, paragraph 3, The first sentence of paragraph three makes more sense if it is included with the information in Paragraph 4, while the second sentence takes on more meaning when included within the context of Paragraph 5. Rather than saying the watershed is "sparsely populated" (by whose definition) this paragraph would make more sense reading something like: Ninety-eight percent of the land in the watershed is publicly owned creating a wide dispersal of the population on the remaining two percent of privately owned land. The primary economic activities of the more populated privately owned land areas consist of farming, ranching, livestock production, dairies, and related agricultural industries. The economic activities are the supporting structure/base for the towns and communities of Oreana, Murphy, Reynolds, Guffy, Wilson, Givens, Marsing and Homedale and their businesses, located within the Succor Creek Subbasin.	Comment noted. Part of these comments will be incorporated into TMDL.
38) Page 42, Paragraph 4, Please include as crops that are farmed: alfalfa hay, grass hay and pasture. These you state later in the document are the main crops in some areas.	These crops will be added.
39) Page 42, The Swan Falls Dam was built to provide power for the Trade Dollar Mine. The extra power was distributed to Silver City and other mines and camps.	Correction will be made.
40) Page 42, Land Ownership, Approximately 17.2% is private land in Owyhee County. The rest is federal and state land. Not: "98% of the land is publicly owned in this watershed."	Land ownership figures will be rechecked and corrected accordingly for the Mid Snake Watershed (numbers may differ since the watershed does not contain all of Owyhee County and also has in addition, Canyon, Elmore and Ada counties).
41) Page 44, Table 3, I question your 2000 population numbers. Explain what the Murphy Division encompasses.	The census information is confusing because the Murphy Division is a census division not actual town population. This section will be clarified.

42) Page 44 "Local Governments" They left out Ada County.	Ada County will be added.
43) Page 44, Table 3 Mid Snake River/Succor Creek Watershed Demographics, I highly doubt that any census will confirm the numbers used for the population of Murphy under the Town listing. At least be consistent in the listings; don't use "Murphy Division" without explaining what the difference in meaning is. According to the Owyhee County Clerk Charlotte Sherburn, the "population of Murphy varies between 70 and 80" with 77 currently listed on the water billings. Quite a difference from the 1,512 this Draft lists as the 2000 population.	The census information is confusing because the Murphy Division is a census division not actual town population. This section will be rewritten to provide clarification.
44) Page 44, Paragraph 1, Swan Falls dam is better described as located between Kuna and Murphy (as it is closer to Murphy than it is to Kuna)	Clarification will be made.
45) Page 44, Paragraph 3, The Owyhee Natural Resource Committee was formed prior to 1994, originally as the Owyhee County Natural Resource Planning Committee. Its name was changed by the Owyhee County Board of Commissioners in 2001 to Owyhee Natural Resource Committee to avoid being confused with the Owyhee County Planning and Zoning Commission. The purpose of the committee is to keep the Board of County Commissioners informed and advised of any and all issues related to the natural resources issues within Owyhee County, and which may include TMDL related issues. You may contact the Director of the Owyhee County Natural Resource Committee (Jim Desmond) for verification of these facts.	This information will be corrected.
46) Page 44, paragraph 5, The reference to the Owyhee Initiative group and the statements made in this draft document should be verified with the Chairman of that group before these assumptions are committed to print.	Corrections will be made regarding these statements.
47) Page 44, paragraph 5, It is presumptuous of DEQ to make statements as to the focus and goals of a group whose actions will be dictated by the passage of (as yet unproposed) legislation.	DEQ did not intend to be presumptuous and thus, will correct their error.
48) Page 45, Tables 4 & 5, The footnotes under both Table 4 and Table 5 "refers to a list created in 1998". Please explain how streams came to be on this list that was created, and by whom.	This information will be added to the footnotes.
49) Page 46, 48, 82, and 249, "Attainability" is briefly mentioned on these pages. Has a "detailed	An evaluation of the attainable uses has not been performed for the streams in the Mid Snake/Succor

evaluation of the attainability of uses" been done for streams in this watershed? If so where is that information located. Page 82, Will "use attainability analysis" be included as a part of the implementation stage or should it have been addressed in this, the assessment stage?	Creek watershed. All practical control measures must be put into place before the Federal Clean Water Act allows beneficial uses to be changes. That is not the case in this watershed. Preferably, and if warranted, as may be the case with Castle Creek, a use attainability analysis is performed prior to the assessment stage. DEQ is in the process of determining whether a UAA is warranted for Castle Creek.
50) Page 47 "Strike to Castle Creek domestic water supply" Whose domestic water supply?	This segment is designated as suitable for domestic water supply in the Idaho Water Quality Standards. No specific user is identified.
51) Page 51, Temperature, I disagree with the "boiling pot" narrative and Table 7. I'm sure that those fish had instantaneous death when dumped into the pot of 90 plus degree water. But in the real world, there is refuge for or escape as is evident by fish survival in the hot Owyhee desert streams. The thermally induced "pot" was probably heated from the bottom in order to get an even temperature for the mortality test. That is not natural. The pools have varying temperatures the further from the surface you go. Springs and sub-surface flows cool the bottoms of those pools creating refuge.	Additional narrative regarding the study methods will be added. Also, narrative will be added addressing the natural temperature variability found in a stream.
52) Page 51, Table 7, Please take the time to explain in detail the method of heating the water that resulted in the "thermally induced coldwater fish mortality. It is my understanding that this is the infamous "boiling pot" method whereby water is artificially heated from the bottom up. Streams (other than those with geothermal water sources) do not heat from the bottom up, but rather are heated by solar radiation from the top down, with cooler water pooling at the bottom. Using the Oregon DEQ 2002 mode of thermally induced mortality is about as comparative as making sun tea versus boiling up a strong pot of the hot English brew.	Additional narrative regarding the study methods will be added. Also, narrative will be added addressing the natural temperature variability found in a stream. The table will also be modified.
53) Page 57 & 163, In some areas of the TMDL the nutrient target level is described as 0.07 mg/L TP, (page 57), rounded and reported to the nearest 100th. On table 48 page 163, TP is reported as 0.071 mg/L TP rounded to the nearest 1/1000th. This gives the impression that Table 48 shows it exceeds the target. The WAG does not think it does. The WAG also questions the loads for TP upstream. The Bruneau/Jacks Creek TMDL goal for TP is 0.08 mg/L. The Snake River at King Hill is 0.075 mg/L. The Strike Reservoir TMDL is yet to be written. Will it be the responsibility of the Strike Reservoir TMDL to "clean up" the water	This watershed will not be responsible for loads originating upstream. In general, in an average water year, the water entering the upstream section of the watershed comes in at the target.

they receive? It is apparent that the DEQ had a short time frame and limited budget to gather data and accepted whatever data was available. Was any data excluded as unreliable?	
54) Page 60 "Intermittent Streams" DEQ failed to accept verbal comments from WAG member on "DRY' streams.	DEQ made every attempt to affirm at the WAG meetings as well as at the public comment meetings that such comments need to be in writing. Furthermore, DEQ stated that specific data showing that perennial pools did not exist must be submitted. None were received.
55) Page 60 & 221, My foremost comment would be that I believe Sinker Creek should be designated as an intermittent stream. I do not find it listed on page 60 or on page 221. Even the historic name by which it is known (SINKER) indicated that it is naturally dewatered in some sections and then rises again in another area.	Sinker Creek is not listed as intermittent because overall there are perennial pools that can be used as refuge by fish. DEQ acknowledges that there are sections where Sinker Creek is dry.
56) Page 65, Figure 2.4, Please move the fish kill photo to its appropriate location immediately below Temperature between Paragraph 1 and Paragraph 2. It can and will be viewed out of context in any but its appropriate location. This photo may have more negative and/or detrimental impacts than are warranted by its inclusion in this document.	The photo will be moved to the suggested location.
57) Page 82, In reference to Castle Creek (pg 82) regarding artesian (hot) water , I am wondering about whether a "water budget" will ever be completed and if not, what the final determination will be.	DEQ is gathering additional information this summer and will determine a water budget by September 2003.
58) Page 87, Table 2.24, Even though the Mid Snake River and its surrounding watersheds are part of the most active geothermal areas in the state of Idaho, this TMDL does not address the effect of geothermal activity on water temperature. Hot wells, both artesian and pumped, abound in this watershed. There is extensive data pertaining to geothermal activity available at IDWR. Underground springs provide a continual source of thermal heating in the Snake River in the Wilson area. Visual evidence of thermal activity can be observed any cold morning by simply looking for an exceptional amount of steam rising from the water body, be it the river, creek, spring or well. Temperature in relation to geothermal heating needs to be addressed where appropriate.	Thermal activity will be addressed as part of the thermal site potential study of the Snake River. Geothermal heating is being investigated as part of the temperature study on Castle Creek.
59) Page 98, Instantaneous BURP data collection... those flows measured in 1998 are not normal at those points. There was a major storm event that caused that much flow at the highway. Usually the	DEQ will add additional text to the document indicating that these flow were likely due to a storm event. DEQ agrees that most of the water in the stream is diverted, as noted in the text directly

Creek is entirely diverted except for seepage at the diversions or limited return flows from the fields above the highway.	above Table 20.
60) Page 99, The 1998 BURP notes that 75% of the water is being diverted. Maybe on that instantaneous date, generally, almost all the water is being diverted except during spring run-off.	This statement will be remove from the document.
61) Page 99, Table 20, An additional footnote (2) should indicate that Brandau Farms 1.57 cfs is also included in the combined R.I.D. Lateral (Bernard Ditch) 17.24 cfs (it can be diverted at either location). I don't know if it would be appropriate at this point, or time, to acknowledge or address the "high flow" water rights as recognized in the Snake River Basin Adjudication.	An additional footnote will be added to Table 20 reflecting this information.
62) It may be of value to note that during the March 15 to November 15 irrigation season, the total Snake River Basin Adjudication decreed water rights for Reynolds Creek Basin total 104.56 cfs.	This information will be added to the document for informational purposes only.
63) Page 99, Table 21, For future reference it might be beneficial to also include an additional table listing the highest flow events chronologically. This would clearly show that some of the highest events occurred within the same season and also emphasize the extreme variation in timing and volume of runoff from year to year: 01-31-63 2,331 12-23-64 3,850 01-28-65 1,113 06-11-65 1,113 01-21-69 899 01-27-70 728 03-02-72 667 06-11-77 1,119 01-11-79 1.662 02-25-82 2,082 04-11-82 861	DEQ agrees. Table 21 will be changed to show the flow events chronologically.
64) Page 105, Pertaining to temperature on Sinker Creek... probably the biggest unaddressed cause is the 30 or so beaver dams on this stream SEGMENT. As stated on page 105 they do act as sediment sinks, which should help that situation, but as for temperature goals they work against us. By pooling the water, slowing it down, and exposing is longer to the sunlight and hot air the temperature is raised.	A narrative on the effects of beavers will be added. DEQ did not summarize the particular effect that beaver activity has had on sections of Sinker Creek.
65) Page 105, Sinker Creek, Beavers. There is a severe beaver problem a short distance above	A narrative on the effect of beavers will be added.

highway 78 and for some distance below the highway and again above Nahas Ranch. BLM has recognized the damage done by the beaver in their stream surveys AND recommended the "the use of a D-8 Cat with come creative, or even uncreative stream channel work to rid the beaver dams". The beaver consume the desirable shading plants, muddy the waters which attract more solar heat, and burrow into the stream banks causing more erosion. This TMDL needs to include a narrative analysis of the beaver problem in this area.	
66) Page 105, Pertaining to Sinker Creek, The conclusions of DEQ personnel about aquatic life beneficial uses not being fully supported may or may not be true since much of the data used to make this determination is more than six years old or has been "extrapolated" from other areas. This could explain why DEQ has failed to take into account the devastation that has occurred from extensive beaver activity in the middle area of the 303d listed section. This beaver activity has destroyed a large majority of the woody vegetation in the past four years and caused extensive bank instability from lost root systems. Washouts have occurred when dams were abandoned because wood supplies were depleted. Few areas of this six mile section of stream between the Sinker 1 thermograph site and the Sinker 3 site have been unaffected by beavers. While the document briefly mentions beaver ponds on page 105 and correctly attributes an increase in water temperatures, DEQ has certainly not given this activity the importance it deserves. This is especially true considering that no livestock grazing occurs in this middle section for 11 months out of the year, whereas the upper area of the listed section which met water quality standards (at Sinker 1 three. site) is grazed year round. At the present time the only control on beavers is the fur market and whoever landowners can get to trap them.	A narrative on the effects of beaver will be added. DEQ staff did use current temperature data, which showed that temperature exceedances occurred. In addition, the bank surveys were done this year and showed areas of unstable actively eroding banks. However, it is important to note that DEQ did find that only an 8% decrease in bank erosion rate was necessary, indicating that this system is close to supporting beneficial uses.
67) Page 109, Sediment, The BLM collected properly functioning Data... indicated an unsatisfactory condition. A stream segment can only be satisfactory or unsatisfactory in BLM's categories. This stream may have been rated as unsatisfactory because it was at risk, put possibly on an upward trend. Eventually meeting the satisfactory rating. This PFC data analysis needs further explanation.	An additional statement regarding the different trends associated with PFC will be added.
68) Page 111, Status of Beneficial Uses, the de-watered section is below the Nahas Reservoir.	Comment noted.

69) Page 116, Table 30, This chart shows a wide variation in flows that occur from year to year, and even during the year. This is typical for all the streams in Owyhee County.	Comment noted.
70) Page 117, Succor Creek Reservoir, Active withdrawal of irrigation water creates an unnatural stream below.	The document will be changed to reflect this comment.
71) Page 134, Beneficial Uses,... excess substrate sediment...What is 'substrate'?	Additional text will be added to the document describing what is meant by "substrate sediment".
72) Page 136, the Bruneau River SCD Board would like to see more concrete data compiled before the TMDL makes specific recommendations and requirements on specific sections of the Snake River and other streams within the watershed. In the TMDL, we are provided with conclusions with little or no data to back it up. We need to know where the samples were taken, how they were taken, what time of the day they were taken, were they representative samples, etc. The data must stand up to scientific standards in order to be valid. We understand that there is a time factor, but we want the TMDL to be as accurate as possible in order to effectively write a TMDL Implementation Plan that will properly address the water quality issues within the watershed.	Comment noted.
73) The Bruneau River SCD will be supporting further evaluation of perennial stream segments and upland condition in 2003. This will include development of a TMDL Implementation Plan on stream segments with perennial flow and documented problems. The District would like to work with DEQ, watershed landowners and partner agencies to properly evaluate these streams in 2003.	DEQ acknowledges the willingness of the Bruneau River SCD to develop implementation measures and work with agencies and landowners alike.
74) Page 137, The Bruneau River SCD feels that DEQ should not try to set the practices required to meet TMDL problems in the TMDL, as that is the function of the TMDL Implementation Plan, not the Sub-basin Assessment and TMDL process. Beyond the implementation plan itself, more specific conservation planning with individual landowners will occur. We will help them choose and apply Best Management Practices that will address the specific issues involved.	While DEQ may list potential BMPs, DEQ recognizes that the actual measures are determined as part of the implementation process.
75) Page 136, The one concern that I do have is the lack of scientific data to back up some of the conclusions in the TMDL. I would like to see more specific data to support the conclusions reached by IDEQ. I feel that it is unfair to put a	DEQ feels that the best available physical, chemical and biological data were used to develop the subbasin assessment and TMDL. DEQ is legally compelled to complete the Mid Snake River/Succor Creek TMDL by December 2002. Given the short

stream on the 303d list without having enough data to prove that it should be listed. Unless it is proved without a doubt that a stream is water quality impaired, it should not be 303d listed. It is very hard to get ranchers and farmers to voluntarily cooperate and implement best management practices on their land when they don't have scientific proof of water quality impairment.	time frame, DEQ collected as much additional data as possible to aid in development of the subbasin assessment and TMDL.
76) Page 136, How imperfect the science of assessing water quality must be. For example, how can a person and/or agency base as assessment of such a limited amount of data? To my knowledge, only two steams (Reynolds and Hardtrigger) possessed data that spanned more than one year. It seems difficult to me, to base the performance of a watershed on such a limited time frame, particularly when that time frame happens to be one of the three driest since the end of the 19th Century.	DEQ agrees that additional data would increase the accuracy of the document. However, DEQ feels that the best available physical, chemical and biological data were used to develop the subbasin assessment and TMDL. DEQ is legally compelled to complete the Mid Snake River/Succor Creek TMDL by December 2002. Given the short time frame, DEQ collected as much additional data as possible to aid in development of the subbasin assessment and TMDL.
77) Page 136, Table 37, I am in complete agreement with DEQ statement "Where viable, steps should be taken to fill the data gaps." Table 37 page 136 Data Gaps Identified prepared by TMDL authors acknowledges areas that need to be addressed are confirmed by DEQ statements made on the following pages:	Comment noted.
a. pg 116 flow data available for upper Succor Creek is limited	Comment noted.
b. pg 117 monitoring data consists only of instantaneous temperature data used to populate SSTEMP used to develop the temperature TMDL	Comment noted.
c. pg 117 pertaining to Bacteria - there are no data available for upper Succor Creek	Comment noted.
d. pg 120 there are no water column sediment data available from upper Succor Creek	Comment noted.
e. pg 123 there is not a numeric value against which TSS conditions in Succor Creek can be compared -- Site specific condition must be assessed to determine an appropriate sediment target	Comment noted.
f. pg 123 reasonable assumption that if 15mg/L TSS was not causing impairment of aquatic life in Boise River, 16mg/L TSS will support aquatic life beneficial uses in lower Succor why is that same assumption not being applies to upper Succor	The same assumption is in fact being applied to Upper Succor Creek, but water column data do not exist for Upper Succor Creek. This is noted in the "Data Gaps" portion of the document. Additionally, As opposed to Lower Succor Creek, salmonid spawning is a beneficial use in Upper Succor Creek (see appendix F). Due to the importance of stream bottom material (substrate) for salmonid spawning, particle size distribution is also assessed in Upper Succor Creek. It is this component that is impairing the spawning beneficial use.

g. pg 124 re: Wolman pebble count -- due to small set of data these have low level of statistical rigor -- however until additional data can be collected they rep. best avail data	Comment noted.
h. pg 125 there is no hard data to support the statement "Data Assessment Methods section describe linkage etc.	Comment noted.
i. pg 125 -- temperature -- period of record was dictated by accessibility to sites and vandalism twice	Comment noted.
j. pg 126 data were not available during spawning period.	Comment noted.
k. pg 132 temperature data were not available for full extent of critical period -- assumptions were made to accommodate lack of data	Comment noted.
l. pg 133 due to insufficient data the entire critical period cannot be evaluated.	Comment noted.
m. pg 133 data are not available for period between 8/22 & 9/21 -- it is assumed....	Comment noted.
n. pg133 however, again due to insufficient data	Comment noted.
o. pg 133 actual data are only available from 6/19 thru 7/15 ... it is assumed	Comment noted.
p. pg 133 difficult to determine due to lack of data	Comment noted.
q. pg 134 data were not available directly above the reservoir during critical period	Comment noted.
r. pg 134 logger was vandalized ... therefore DEQ assumes	Comment noted.
s. pg 134 timing of - criterion - is difficult to determine due to limited data	Comment noted.
78) Page 134, Status of Beneficial Uses If data were broken out into two stream reaches, Upper and Lower Succor Creek, and the lack of data were incorporated into this portion the status of beneficial uses for Upper Succor Creek it would look like this:	
a. E. Coli - there are no data available for Upper Succor Creek pertaining to bacteria pg 117	Bacteria conditions were not assessed for Upper Succor Creek.
b. Sediment - states that "data indicate that excess substrate sediment is impairing CWAL and SS in two segments of Upper Succor Creek." Yet these are DEQ statements about that data:	Comment noted.
c. there is no water column sediment date available from Upper Succor Creek pg 120	Comment noted.
d. there is not a numeric target against which TSS conditions in Succor Creek can be compared, site specific condition must be assessed to determine an	Comment noted.

appropriate sediment target pg 123 e. If it a reasonable assumption that "if 15mg/L TSS was not causing impairment of aquatic life in Boise River, 16mg/L TSS will support aquatic life beneficial uses in Lower Succor" why is that same assumption bot being applies to Upper Succor? pg 123	Upper Succor Creek, but water column data do not exist for Upper Succor Creek. This is noted in the "Data Gaps" portion of the document. Additionally, As opposed to Lower Succor Creek, salmonid spawning is a beneficial use in Upper Succor Creek (see appendix F). Due to the importance of stream bottom material (substrate) for salmonid spawning, particle size distribution is also assessed in Upper Succor Creek. It is this component that is impairing the spawning beneficial use.
f. re: Wolman pebble count, due to small set of data these have low level of statistical rigor, however until additional data can be collected they represent the best available data pg 124	Comment noted.
g. in reviewing table 32 Dr. Chad Gibson pointed out that there is no hard data to support the statement "data assessment methods section describe linkage that has been developed between bank stability and fine substrate material pg 125	Comment noted.
h. The only concrete piece of data that DEQ presents pertaining to sediment is a photo on page 121 which is literally noted on page 120 as "Figure 2.46 shows a dated photograph of the water column and substrate near Berg Mine. Note the good water clarity and good distribution of substrate material."	Comment noted.
79) Temperature - pertaining to both cold water aquatic life and salmonid spawning:	
a. flow data available for Upper Succor Creek is limited pg 116	Comment noted.
b. monitoring data consists only of instantaneous temperature data used to populate SSTEMP used to develop the temperature TMDL PG 117	Comment noted.
c. period of record was dictated by accessibility pg 125	Comment noted.
d. period of record was dictated by vandalism	Comment noted.
e. data were not available during spawning period pg 126	Comment noted.
f. temperature data were not available for dull extent of critical period pg 132	Comment noted.
g. assumptions were made to accommodate lack of data pg 132	Comment noted.
h. due to insufficient data the entire critical period cannot be evaluated pg 133	Comment noted.
i. data are not available for period between -- it is assumed pg 133	Comment noted.
j. however, again due to insufficient data pg 133	Comment noted.

k. Ambient air temperature data seems to have been collected from	Comment noted.
80) These statements made by DEQ in this Draft TMDL, pertaining to Upper Succor Creek, exhibit the need to expand on the DEQ statement (pg 136) "Where viable, steps should be taken to fill the data gaps."	DEQ agrees that the aforementioned statements exhibit the need to fill data gaps. The process by which this will happen will be further defined in the TMDL implementation plan.
81) Perhaps in the first phase of the next step, implementation, we should emphasize data collection first, a uniform consistent monitoring plan and schedule second, all prior to implementing costly, expensive projects that may or may not be effective. 82) Page 137, My concern is in the "Implementation Process" with the oversight and follow-up committee having the scientific data specific to this area in regard to making changes that are necessary for the TMDL.	DEQ feels that the TMDL shows a necessity for some level of best management practice implementation. However, DEQ agrees that additional data collection following a consistent monitoring plan should be placed as a high priority in the implementation plan. The implementation plan will be developed cooperatively by the affected stakeholders, the WAG, and the designated agencies (including DEQ). All of these entities will have access to the scientific data necessary the update the TMDL.
83) Page 138, Table 38, under proposed action the Snake River from CJ Strike to Castle, you have listed TDG. TDG (Total Dissolved Gases) is not listed in the glossary. Please add it to the glossary.	TDG will be added to the glossary.
84) Page 149, I believe that the temperature goals are unattainable by your definition on page 149. By this definition in the draft I believe the temperature listing should be dropped at least in the section between the Edwards Ranch and the Nahas Ranch. This section is basically inaccessible to all but the most dedicated hiker and some occasional wildlife. Leslie Freeman attempted a short section above our diversion but turned back because of the difficult almost impenetrable terrain. This area has been virtually unaffected by any influence other than nature for many, many years. If ever a place could be called pristine this would surely qualify. As such it has a very narrow stream channel and almost total shading in many areas. If a cool temperature goal were attainable it should be attainable here. I feel that the affects of the narrow, very rocky canyon on the ambient temperature has been overlooked.	The intermittent stream classification used in this TMDL is for those streams where perennial pools do not exist. Sinker Creek appears to have perennial pools throughout the summer in this reach. However, the stretch below the diversion for Nahas Reservoir is dewatered and does not have perennial pools. This stretch was not considered for the TMDL allocations. The section below the Edwards Ranch and above the Nahas diversion does not have bank stability problems and is not subject to riparian shade increases beyond those which would occur from the existing vegetation increasing in size. This will be documented as part of the implementation process. Topographic shade as well as ground reflectivity was accounted for in the SSTEMP model. If additional information is gathered that suggests that other parts of Sinker Creek have natural factors that prevent target attainment, the temperature target will be adjusted accordingly.
85) Page 149 & 150, Temperature, Narrative recognized this basin is in the desert and is subject to extreme heat during the late spring and summer months. I agree, the "best achievable temperature" is a reasonable target	Comment noted.
86) Page 151, these conclusions were drawn using empirical derived characteristics and concepts.	DEQ agrees that additional data would increase the accuracy of the document. However, DEQ feels

There are numerous statements of "no available data" "insignificant data", "assumptions" "is difficult to determine due to limited data" scattered through this document.	that the best available physical, chemical and biological data were used to develop the subbasin assessment and TMDL. DEQ is legally compelled to complete the Mid Snake River/Succor Creek TMDL by December 2002. Given the short time frame, DEQ collected as much additional data as possible to aid in development of the subbasin assessment and TMDL.
87) Page 157 , Narrative on Nutrients from C. J. Strike down stream: The WAG is concerned about apparent inconsistencies in nutrient data on the Snake River from C. J. Strike down stream. Different agencies collected data including DEQ, Idaho Power and USGS. Different techniques were used i. e.: Collecting off of a bridge in mid stream, grab samples from the bank, and in the case of USGS at Murphy, a cross section with many samples combined and reported as one. It was also suggested that two different laboratory procedures may have been used. On page 157 of the TMDL it says the MOS for nutrients is 13%. Supportive data provided by DEQ, at a meeting in Caldwell, compared 2000 May-September data from USGS with DEQ data from the same time period. The July data was almost identical, but the May and June data varied by 35% and 29%. The WAG feels that this is but one example of confusing, incomplete, and questionable data.	Comment noted. DEQ is charged with writing TMDLs using available data. The TMDL is an iterative process, meaning that as more data becomes available, targets, allocations etc. can be refined to more accurately reflect the on-the ground conditions. This dataset will be reviewed again during the determination of whether or not a load allocation is necessary between CJ Strike and Swan Falls Dam. A correlation factor will be applied to the USGS data, if necessary. This would be similar to how Idaho Power Company utilized USGS data from the Boise River with their own in-house data.
88) Page 163, Under Nutrient Allocation in table 48, it shows that Snake River below C. J. Strike has a Phosphorus concentration of 0.07 and Snake River at mile 449.3 has a concentration of 0.071. We do not feel that this segment should have a nutrient allocation for such a small difference of .001, sine the degree of error (MOE) for the spread sheet that you used is 0.1 (100 times greater).	This difference represents a substantial monthly load of phosphorus. However, in response to how close the concentrations are, DEQ is deferring determination of an allocation until sources of phosphorus and trends in increasing concentration can be determined. This will allow DEQ to address any margin of error over or underestimation of phosphorus concentrations.
89) Page 166, Temperature Allocations, DEQ recognizes SSTEMP model provides a gross estimate of heat lost or gained. There are to many unknowns when determining effects of inputs	The model calibration work presented in Appendix G shows that the predicted water temperatures (as per SSTEMP) and the actual water temperatures were statistically similar. As such, DEQ feels that the temperature allocations are reliable.
90) Page 178, Data collected by a person with as much bias as Katie Fite is bound to be unreliable and slanted. Katie Fite is the "expert witness" used in lawsuits aimed at total removal of livestock grazing on both private and public lands.	The person to whom you are referring was an employee of IDFG at the time the data were collected. Additionally, the primary author (Allen) and the secondary author (Flatter) remain IDFG employees. The sole intent of the referenced studies was to collect fish distribution and abundance data.
91) Page 209, DEQ statement "As per DEQ WBAG II guidance (Grafe et al. 2002), the Mid Snake/Succor Creek subbasin assessment uses the site-specific spawning period for redband trout.	The temperature data displayed on pages 127-131 are in fact basin/site specific (to the Mid Snake/Succor Creek basin). However, DEQ agrees that in most cases data were not available for the

The basin-specific spawning period is March 1 through June 15." But we note that DEQ does not have site-specific data pertaining to Upper Succor Creek. If site specific data were used pertaining to spawning periods and those periods occurred at an early date than the basin specific periods, as could easily happen in this semi-arid climate characterized as hot and dry in the summer and cold and dry in the winter, it may preclude its listing for temperature. This is an area where DEQ's statement on page 136 "Where viable, steps should be taken to fill the data gaps" could be most appropriately and productively heeded.	extent of the spawning period. To account for that data gap, DEQ assumed that all temperatures prior to the date when data became available were BELOW the criteria. Even with this assumption, greater than 10% of the data still exceeded the spawning daily average criterion (as shown in Table 35). Hence, the stream would indeed be listed for temperature.
92) Page 241, The fisheries question has been addressed by the letter from Jeff Dillon on page 241 and SINKER should be considered not suitable for spawning in the reaches of interest. It is also quite difficult to have fish habitat in a dry streambed.	Comment noted.
93) The terms "EMPERICAL characteristics" and "EMPIRICALLY derived" are used. Please include the definition of "empiric" and/or "empirical" in the glossary. The New World Dictionary of the American Language Second College Addition defines them as: empiric em.pir.ic 1. a person who relies solely on practical experience rather than on scientific principles 2. (Archaic) a practitioner without proper qualifications and regular training; charlatin; quack empirical em.pir.i.cal 1. relying or based solely on experiment and observation rather than theory (the empirical method) 2. relying or based on practical experience without reference to scientific principles (an empirical remedy) empiricism em.pir.i.cism 1. experimental method; search for knowledge by observation and experiment 2.a) a disregarding of scientific methods and relying solely on experience b) quackery 3. the theory that experience is the only source of knowledge	The word “empirical” will be added to the glossary.
94) Page 248, Climatic gauging station locations used were Western Regional Climate Center at	Comment noted.

http://www.wrcc.dri.edu/climsum.html.	

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